THE IMPACT OF INTELLECTUAL CAPITAL AND BALANCED SCORECARD IMPLEMENTATION ON FIRM PERFORMANCE

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SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

SCHOOL OF MANAGEMENT

UNIVERSITY OF BRADFORD

2017

ABSTRACT

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Key words: Intellectual Capital, Balanced Scorecard, Competitive Advantage, Firm Performance.

The connotation that intellectual capital (IC) replaces physical assets as the major source of competitive advantage (CA) is now generally accepted in both management and accounting literature. Thus, IC management has become a major concern for management regarding enhancing firm performance (FP). The main objective of this thesis is to examine the relationship between IC and FP and whether this relationship is direct or indirect through the firm's CA, IC management tool use (through balanced scorecard (BSC) implementation) and the success in the use of the IC management tool. To achieve this objective, this thesis is divided into three research frameworks. The first framework examines the mediating effect of CA on the relationship between IC and FP. The second framework focuses on the mediating effect of BSC implementation on the relationship between IC and firms' CA and performance. The third framework investigates the mediating effect of the success factors and BSC implementation success on the relationship between BSC implementation extent, CA and FP.

This study used both quantitative and qualitative data. The quantitative data were collected using a questionnaire sent to 192 Omani firms with a response rate of 54%. Depending on the survey participants' willingness and availability, 32 interviews were also conducted in order to support the results from the survey further.

The results suggest that the relationship between IC and FP is indirect through the mediation impact of the extent and success of BSC implementation, the success factors and CA.

ACKNOWLEDGMENTS

Completing this stage in my career would not be possible without the blessing and mercy of Allah. So, thanks to Allah, the most Gracious and most Merciful who gave me the strength, courage and blessing to complete this study.

First, I would like to extend my sincere gratitude and appreciation to my supervisors, Dr. Jing Li and Professor Khelifa Mazooz from the University of Bradford, for their continuous support, guidance, inspiration, encouragement and patience throughout my research process.

I would also like to extend my thanks to all the staff at the University of Bradford who helped and supported me during my stay in the UK and facilitated me with all the requirements to make this study successful.

My sincere thanks goes to the Ministry of Manpower for supporting me financially. I give thanks and appreciation to all the firms and managers that participated in this study's data collection in spite of their busy schedules. I'm also grateful to the directorate of statistics staff at the Ministry of Manpower for providing the firm list with contact details, which make the data collection much easier.

Last but not least, my special thanks goes to my husband, Ali Al Nahdi, for his support, encouragement and understanding of my situations throughout this study. I sincerely thank my children Bayan, Rawan, Razan, Rayan, Saeed and Abdul Rahman for their patience and love that made this thesis completion successful. I also want to thank my mum and dad, who encouraged and supported me morally with their endless love. I also thank all my sisters and brothers who encouraged me throughout all the process.

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LIST OF ABBREVIATIONS

IC	Intellectual capital
HC	Human capital
RC	Relational capital
SC	Structural capital
CA	Competitive advantage
FP	Firm's performance
BSC	Balanced scorecard
RBV	Resource-based view
SEM	Structural equation modelling
CB-SEM	Covariance based structural equation modelling
PLS-SEM	Partial least square structural equation modelling
RF1	First research framework
RF2	Second research framework
RF3	Third research framework

CHAPTER ONE: INTRODUCTION

1.1 Overview

This study combines two of the major issues within the management accounting domain, i.e. intellectual capital (IC) and balanced scorecard (BSC). It focuses on examining the impact of IC and BSC implementation on firms' competitive advantage (CA) and performance. IC is one of the current major issues in the management accounting field. This is because it is considered one of the most valuable resources in the firm due to its major contribution to value creation (Stewart, 1997; Edvinsson and Malone, 1997). Regarding its importance, many studies found that there is a positive relationship between IC and FP (Youndt et al., 2004; Tayles et al., 2007). Therefore, IC measurement and management became the focus for both academician and practitioners, so many scholars developed different tools and frameworks for IC measurement or management (Sveiby, 2010). One of the most common IC management tools is the BSC (Speckbacher et al., 2003). Previous studies found that BSC implementation has a positive impact on FP (Davis and Albright, 2004; De Geuser et al., 2009). Although both IC and BSC implementation contribute positively to FP enhancement, previous studies investigated the impact of IC and BSC on FP separately.

This study is different as it aims to link the two concepts, i.e. IC and BSC, together by examining whether the relationship between a firm's level of IC and its performance is direct or contingent on the variables of using the IC management tool (i.e. BSC implementation), the success of BSC implementation and a firm's CA, as is represented by the main research framework shown in Figure 1.3. This thesis is divided into three research frameworks. The literature review, the research gaps and the hypotheses development for each framework will be discussed in the literature review chapters.

1.1 Motivation and contribution

Since the 1980s, the global economy has shown a rapid change from being industrial to knowledge based (Guthrie et al., 2012). The traditional economic theory most often describes a firm's classic assets such as land, building, labour and other economic assets as the base for value creation (Sullivan, 2000). However, the resource-based view (RBV) theory changed this concept to focus on different resources, particularly the intangible resources, by stating that these resources are more likely to contribute to business success (Barney, 1991). These types of resources later became known as IC. Edvinsson and Malone (1997) defined IC as the knowledge, experience, technology, relations with customers and employees' capabilities that create CA. However, the management accounting field refers to IC as the difference between a firm's book and market values (Sullivan, 1998). Based on these definitions, many scholars started to provide indices in order to list possible elements that can be categorized under IC (Edvinsson, 1997). Whilst there is no uniform classification of IC yet, there is a consensus that it can be classified into three main categories, which are human capital, relational capital and structural capital[1] (Sveiby, 1997; Bontis, 1998; Sullivan, 2000). Since recognizing the importance of these valuable resources, many scholars have been trying to understand how IC creates value (Carlucci et al., 2004; Sirmon et al., 2007) and others have suggested tools to measure and manage IC, such as the Skandia Navigator, IC monitor, and BSC (Sveiby, 2001).

One of the main focuses of the IC literature has been on understanding the IC elements that create value. One strand of IC research began to examine the relationship between IC elements and FP. For example, Collins and Clark (2003) focused on the relationship between human resource practice, social network and FP, while Ngo and O'Cass (2013) focused on investigating the relationship between FP and IC elements such as innovation capability, customer participation and service quality. There was scarce attention given to studying the comprehensive picture of IC and its impact on FP (Youndt et al., 2004). The work of Youndt et al. (2004), Reed et al. (2006), Tayles et al. (2007) and Kamukama et al. (2011) were among the minority who tried to cover the comprehensive picture of IC and link it to FP.

Youndt et al. (2004) were the first to cover all of the most important elements of IC and investigate their impact on a firm's financial performance, but the impact of CA on this relationship was not considered. While the authors stated that IC

[1] See section 2.2.1.1 of the literature review chapter for more clarification.

investment may vary according to business requirements, they consider high IC firms to be those with high human, social and organizational capital. They didn't consider firms which focus their investment on either human, relational or structural IC as high IC firms. The way they classify high IC firms is contradicting with their statement that IC investment may vary according to business requirements. The results of Youndt et al.'s (2004) study did not fully support their hypothesis that high-IC firms outperform low-IC firms.

Reed et al. (2006) examined the impact of IC on FP of the banking industry in the United States. Although the study covered all IC components, the interactions between each two of the three IC components were investigated separately and the impact of CA on this relationship was not considered. Reed et al. (2006) argue that IC components' impact on FP is contingent on the value of other components. Therefore, they tested the interaction between two IC components at a time in order to understand their interaction impact on FP. The main research hypotheses were not fully supported, as the interaction between some of the IC components was not always associated with better performance.

Like Youndt et al. (2004) and Reed et al. (2006), Tayles et al. (2007) studied the relationship between IC level and the changes in management accounting practice within the Malaysian market. Among the hypotheses they tested is the relationship between IC level and FP. Both operational and financial performance were tested in their study. However, the focus of their research was only on the relationship between IC, management accounting practice and FP and it did not consider the role of firms' CA in this relationship.

In short, previous studies generally found a positive relationship between IC and FP, but none of them investigated the impact of IC on firms' level of CA. Whilst existing evidence suggests that IC improves FP, the exact means through which IC affects FP is still unclear (Hsu and Wang, 2012). This is perhaps why the IC research has started to shift towards understanding how firms can create value from investing in IC. Thus far Kamukama et al. (2011) is the only study that examined the impact of the comprehensive value of IC on both CA and FP, arguing that the relationship between IC and FP is indirect through firms' CA.

However, Kamukama et al. (2011) focus only on the Ugandan microfinance institutions. Therefore, their findings cannot be generalized to other industries. Due to the importance of IC in value creation, understanding how IC creates value attracted attention of academics and practitioners alike. Kamukama et al. (2011) suggest that CA enhancement is one way of creating value from IC investment. In order to provide more generalizable evidence, the first framework of this research aims to examine the relationship between IC and performance of firms from different industries. In addition, this study aims to examine the relationship between IC and CA in relation to both financial and operational performance.

IC measurement and management is another way to explain the relationship between IC and FP. While Ittner et al. (1997) have argued that IC measurement for management purposes improves FP, there is a lack of research that focuses on enhancing our understanding of this impact. There are many tools developed by practitioners and academicians to measure IC (Sveiby, 2010). The most commonly implemented tool among them is the balanced scorecard (BSC) (Hoque and James, 2000, Speckbacher et al., 2003, Hoque, 2013). BSC is a measurement and management tool used to measure a firm's financial and non-financial performance and link them to the implementation of the firm's overall strategic plan (Kaplan and Norton, 1992, 1996a, 1996b). It is considered an important tool for IC management (Kaplan and Norton, 2004; Ittner, 2008). Due to the fast diffusion of the BSC implementation, the research focus in BSC has been on understanding its implementation and its effect on FP (Hoque and James, 2000; Davis and Albright, 2004; De Geuser et al., 2009). Many of the previous studies found the implementation of BSC to be performance enhancing (Davis and Albright, 2004; De Geuser et al., 2009). In addition, it is argued that BSC implementation leads to a better competitive position (Iselin et al., 2008). Indeed, in order for firms to understand how IC management leads to better CA, the relationship between BSC implementation and firms' CA needs to be investigated.

Unfortunately, none of the previous studies investigated the joint effect of IC level and extent of BSC implementation on a firm's CA and performance. Prior studies investigated the impact of IC (Youndt et al., 2004; Reed et al., 2006;

Tayles et al., 2007) and BSC implementation (Hoque and James, 2000; Davis and Albright, 2004; De Geuser et al., 2009). The relationship found between IC and FP is mixed, as not all IC components are found to lead to better performance (Rehman et al., 2011; Rehman et al., 2012). Tayles et al. (2007) found that high-IC firms are associated with a high level of use of IC measurement tools such as BSC, and Ittner (2008) argues that IC management improves FP. The findings of Tayles et al. (2007) and Ittner (2008) indicate a possible link between IC, IC management through BSC implementation and FP. Thus, we argue that managing IC through BSC implementation may enhance the relationship between IC and FP. None of the previous studies consider the importance of BSC in IC management and how IC management through BSC implementation might lead to better FP. Understanding the link between the three variables could encourage firms to give more priority to IC management.

Previous studies show the following: (1) high-IC firms are more likely to implement BSC (Tayles et al., 2007), (2) BSC implementation enhances CA (Iselin et al., 2008) and performance (De Geuser et al., 2009), (3) CA is associated with better performance (Kamukama et al., 2011), and (4) IC is positively associated with FP (Youndt et al., 2004). Based on the above findings, this study argues that IC affects a firm's CA and performance indirectly through BSC implementation (see Figure 1.2 for the research framework). This study contributes to the literature by providing a new framework that links IC, BSC implementation, firms' CA and performance in order to explain the mediating effect of BSC implementation on the relationship between IC and both CA and FP.

The literature also shows that BSC implementation is not always successful (Zeng and Luo, 2013) and does not always lead to better performance (Ittner et al., 2003). Zeng and Luo (2013) attributed BSC implementation failure to the misunderstanding of BSC implementation requirements. BSC is also described as a management control system, and too much control can lead to implementation failure (Simons et al., 2000; Kaplan and Norton, 2008b). In order to reduce the control effects, Kaplan and Norton, (2008b) suggested the inclusion of some motivational factors for better implementation, Kaplan and Norton (2008a) argued that Factors such as management support, linking a firm's incentive plans to BSC implementation and implementing the BSC at different business units of the firm, are amongst the key determinants of successful BSC. These factors are referred to as 'success factors' hereafter in this study. Whilst the role of the success factors in relation to FP has been investigated (e.g. Kaplan and Norton, 2008b; Cianci et al., 2013), their impact on the success level of BSC implementation is not yet examined.

The discussion above shows that not all BSC implementations will be successful and that the success factors can strengthen the association between the extent of BSC implementation and their success. Therefore, this study argues that the success factors play a mediating role for the relationship between the extent and success of BSC implementation. Further, as discussed, not all BSC implementations will lead to better performance and firms need to be successful in the implementation in order to realize the expected performance. This study therefore argues that BSC implementation success plays a mediating role between the relationship of BSC implementation extent and firm performance.

To summarise, this study is the first to provide a comprehensive framework that explains the relationship between IC and FP. It is also the first to investigate whether this relationship is affected by BSC implementation, the success factors, the success in BSC implementation and the firm's CA.

1.2 Research objectives, questions, and hypotheses

The main objective of this thesis is to provide generalisable evidence that the relationship between IC and firm performance is indirect and contingent on variables of IC management through the extent of BSC implementation, BSC success factors, the success in BSC implementation and a firm's CA, as presented by the third research framework shown in Figure 1.3. To achieve the main research objective, this thesis will be divided into three research frameworks according to the progress of the investigation represented by the frameworks shown in Figures 1.1, 1.2 and 1.3.

1.2.1 Intellectual capital, competitive advantage and firm performance

The main objective of this research framework is to investigate whether the level of IC directly affects firm performance or if the effect is contingent on a firm's CA (see Figure 1.1 below for the research framework). In order to achieve the above objective, this study aims to answer the following questions:

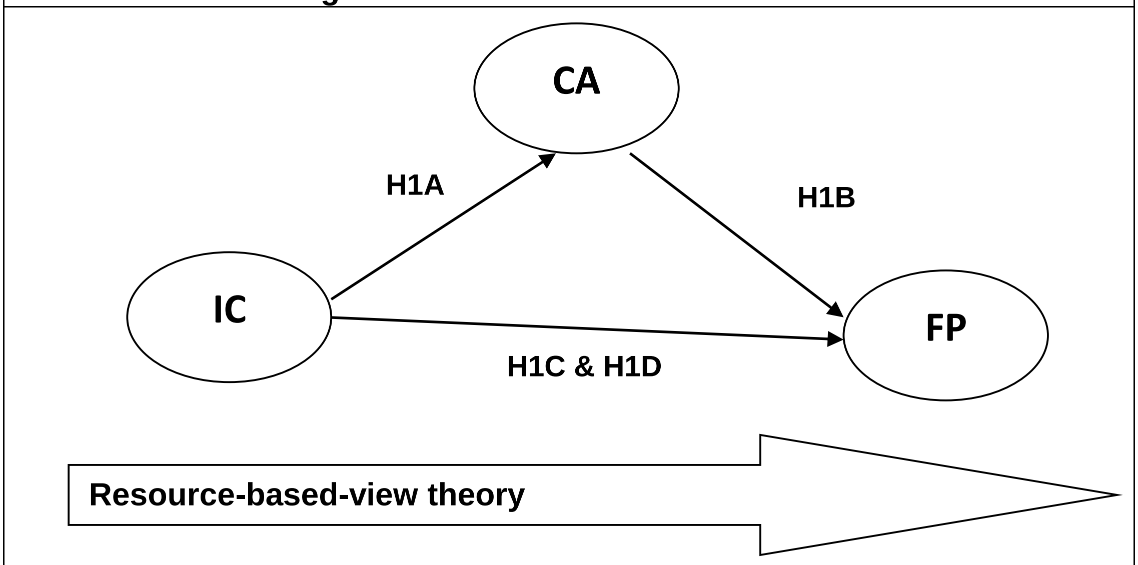
The main research question:

RQ1. Does the level of IC within firms have an indirect effect on FP through firms' level of CA?

Based on the literature review and the research questions identified, four research hypotheses are proposed as listed below. The detailed discussion of the hypotheses development[2] is provided in the second literature review chapter.

H1A. High-IC firms have greater CA than low-IC firms.
H1B. Firms with high CA outperform firms with low CA.
H1C. High-IC firms outperform low-IC firms.
H1D. IC has an indirect effect on FP via firms' CA.

Figure 1.1: First research framework



[2] A detailed discussion of these hypotheses is presented in the second literature review chapter 3.

1.2.2 Intellectual capital, BSC implementation, competitive advantage and firm performance

The main objective of this study is to investigate whether the level of IC has a direct impact on a firm's CA and performance or if the effect is through BSC implementation. The relationship between the four variables of IC, CA, BSC implementation and FP will be investigated in three steps, as suggested by the research framework shown in Figure 1.2. To achieve the above objective, this study asks the following main questions:

RQ2.1. Does the level of IC affect the level of CA through the extent of BSC implementation?

RQ2.2. Does the level of IC affect FP through the extent of BSC implementation

RQ2.3. Does the extent of BSC implementation within firms affect FP through CA?

Based on the literature review and the research questions for this research topic, we propose the following hypotheses[3]:

H2.1A: Firms' level of IC is positively associated with the level of BSC implementation.

H2.1B: Firms that implement BSC have greater CA than those that do not.

H2.1C: The impact of IC on firms' CA is indirect via IC management through BSC implementation.

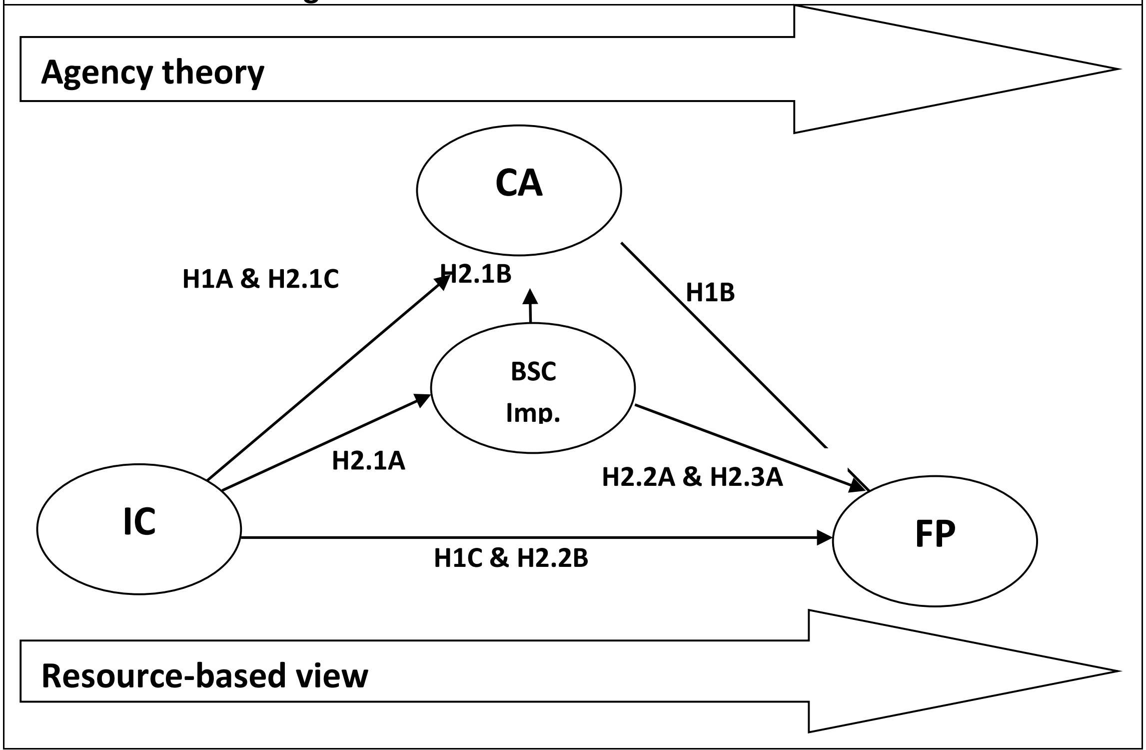
H2.2A: Firms that implement BSC outperform those that do not.

H2.2B: The impact of IC on FP is indirect via IC management through BSC implementation.

H2.3A: The impact of BSC implementation on FP is indirect via firms' CA

[3] A detailed discussion of these hypotheses is presented in the second literature review chapter 3.

Figure 1.2: Second research framework



1.2.3 Extent of BSC implementation, the success of BSC implementation and FP

The main objective of this research framework is to provide evidence that (1) the extent of BSC implementation is associated with the success factors, (2) the success factors are associated with BSC implementation success and (3) the relationship between the extent and success of BSC implementation is indirect via the success factors. It also aims to investigate whether the extent of BSC implementation affects firms' CA and performance directly or if the impact is through the success in BSC implementation. The literature review suggests that there are factors, i.e. management support, linking incentive plans to BSC implementation, and the implementation of BSC at different units of the firm, that affect BSC implementation and a firm's success. As a result, this study aims to investigate the association between these three factors and the extent and success in BSC implementation. This study also suggests that these factors have a mediation impact on the relationship between the extent of BSC implementation and its success. Based on the above proposal and the gap identified in the literature, the following research questions have been designed:

The main research questions:

RQ3.1 Does the extent of BSC implementation have an indirect effect on the success in BSC implementation through the factors of (i) management support, (ii) link implementation to incentives and (iii) implementation at different business units of the firm?

RQ3.2 Does the extent of BSC implementation have an indirect effect on firms' CA through the success in BSC implementation?

RQ3.3 Does the success in BSC implementation have an indirect effect on FP via CA?

Based on the literature review chapter and in order to answer the above research questions, the study propose the following research hypotheses[4].

H3.1A. Firms with a higher extent of BSC implementation are associated with greater management support to BSC implementation.

H3.1B. Firms with greater extent of BSC implementation are more likely to link incentives to BSC implementation.

H3.1C. Firms with a higher extent of BSC implementation are associated with high BSC implementation at different business units of the firm.

H3.2A. Firms that provide greater management support to BSC implementation are more successful in BSC implementation.

H3.2B. Firms that link incentives to BSC implementation are more successful in BSC implementation.

H3.2C. Firms that implement BSC at different business units of the firm are more successful in BSC implementation.

H3.3A.The relationship between the extent of BSC implementation and the success in BSC implementation is indirect through management support.

[4] A detailed discussion of these hypotheses is presented in the second literature review chapter 3.

H3.3B.The relationship between the extent of BSC implementation and the success in BSC implementation is indirect through incentives linkage to BSC implementation.

H3.3C.The relationship between the extent of BSC implementation and the success in BSC implementation is indirect through BSC implementation at different business units of the firm.

H3.4A. Firms with a high extent of BSC implementation are more successful in BSC implementation than those with a low extent of BSC implementation.

H3.4B. Firms that are more successful in BSC implementation have greater CA.

H3.4C.The effect of the extent of BSC implementation on firms' CA is indirect through the success of BSC implementation.

H3.4D.The effect of the extent of BSC implementation on FP is indirect through the success of BSC implementation.

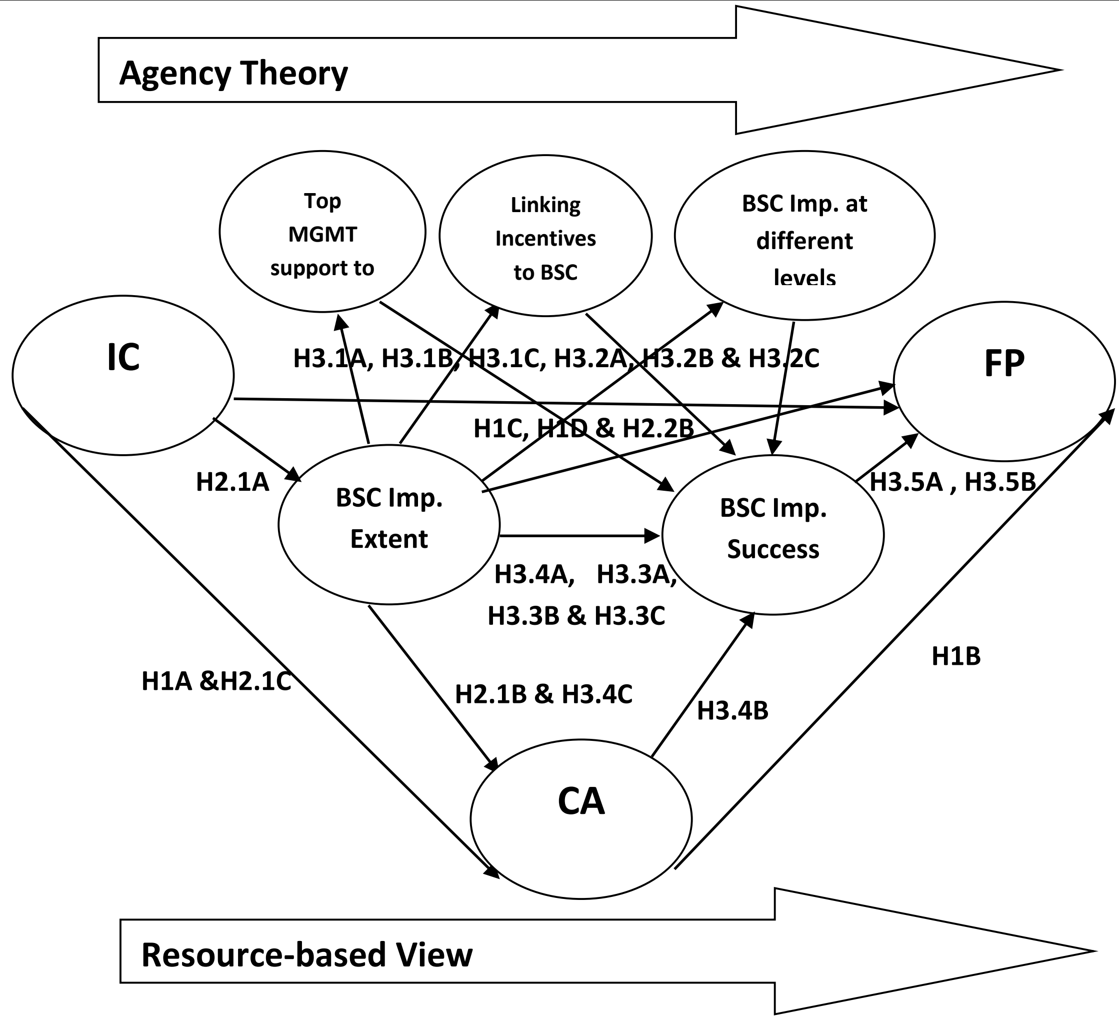
H3.5A. Firms with greater success in BSC implementation outperform those with less success.

H3.5B.The effect of the success in BSC implementation on FP is indirect through CA.

1.3 Research methodology

To study the above described relationships, this study mainly uses a questionnaire survey. The findings from the questionnaire survey will be supplemented by semi-structured interviews. The questionnaire design was mainly drawn and adapted from the previous literature to fit the context of this study. The study will be applied to multi-industry firms operating in the Omani market context due to the following reasons. In 1994, sultan of Oman (Qaboos Bin Saeed) announced 'Oman Vision 2020'. The main reason for this announcement is to provide guidance for Omanis to achieve economic balance and sustainable growth.

Figure 1.3: Third research framework



The major goal of Oman Vision 2020 is to focus on human resources development as the main source of economic balance and sustainable growth. Considering the role of human capital in IC overall development and the role of IC in economic development, this study chose the Oman market as the context for studying the impact of both IC and IC management on FP due to the rareness of such research application. The participants of the study are managers from the top three management levels of big firms operating in the Omani market. The research is targeting big firms, i.e., those with 500 employees and more, as these firms are more likely to invest in IC and implement BSC. The interview participants are volunteers that participated in the questionnaire survey.

This study will use structural equation modelling (SEM) for data analysis. Alavifar et al. (2012) defined SEM as *a 'powerful multivariate technique that is specialized versions of other analysis methods and enables researchers in* *measurement of direct and indirect effects and performing test models with multiple dependent variables and also using of several regression equations simultaneously'* (Alavifar et al., 2012, p.326). SEM is also known as '*a multivariate technique combining aspects of factor analysis and multiple regression that enables the researcher to simultaneously examine a series of interrelated dependence relationships among the measured variables and latent constructs (variants) as well as between several latent constructs'* (Hair, 2010, p. 634). Alavifar et al. (2012) argue that SEM was found to be more suitable and practical over multivariate regression for recent research problems due to the following reasons: (1) it has more flexible assumptions, (2) it has more measurement error reduction by using confirmatory factor analysis, (3) it has attractive interface and more visual analysis, (4) it is used to test total model rather than one coefficient at a time and (5) it has the ability to manage difficult data such as time series, incomplete and non-normal type of data. Therefore, this study uses SEM for data analysis for the following reasons: (1) there are many latent variables (e.g. IC, CA, extent of BSC implementation and success in BSC implementation) in the causal relations being studied, and the study is using many questions in order to measure these latent variables, (2) the relationships under investigation require the testing of more than three variables at the same time, which is hard to achieve with the normal multivariate regression analysis and (3) SEM is more accurate in estimating the mediating impact of the prescribed latent variables under investigation.

1.4 Findings

As mentioned previously, this research is divided into three research frameworks. Regarding the first framework that investigates the relationship between IC, CA and FP, this study found that there is positive and significant relationship between IC and FP, which supports this study's hypothesis that high-IC firms outperform low-IC firms. Another finding shows that high-IC firms are associated with high CA. It also found that CA is positively associated with FP, which supports the hypothesis that high-CA firms outperform low-CA firms. Based on the above two findings, this study proves that firm CA partially mediate the relationship between IC and FP.

With regards to the second framework that investigates the relationship between IC, BSC implementation, CA and FP, this study found that all the proposed relationships are positive and significant. The finding shows that firms' level of IC is positively associated with the extent of BSC implementation, CA and FP. The results also show that BSC implementation extent is positively and associated with firm's CA and performance. Based on that the study provided strong support that the extent of BSC implementation partially mediates the relationship between IC and CA as well as the relationship between IC and FP. Last but not least, the study found that firm CA partially mediates the relationship between the extent of BSC implementation and FP.

Finally, the third research framework investigates the relationship between the extent of BSC implementation, BSC implementation success, the success factors for BSC implementation, CA and FP. The result presented in chapters 6 and 7 provides strong support to all the hypotheses proposed by this research framework. The findings prove that BSC implementation extent has a positive and significant relationship with management support of BSC implementation, incentive links to BSC implementation, BSC implementation at different levels of the firm, BSC implementation success, CA and FP. The findings also show that there is positive and significant association between the three success factors and the BSC implementation success. The BSC implementation success was also found to be positively and significantly associated with both firm CA and performance. According to the above findings, this study also proves that the above relationships are linked through three mediators. First, the findings show that the three success factors partially mediate the relationship between BSC implementation extent and the BSC implementation success. The second mediation relationship is between BSC implementation extent and FP. The study found that the success in BSC implementation and CA fully mediates the relationship between BSC implementation extent and FP. Thirdly, the BSC implementation success is also found to partially mediate the relationship between BSC implementation extent and CA. Lastly, the relationship between BSC implementation success and FP is found fully mediated by the firm CA.

The analysis and the findings of the three studies are presented by Tables 6.6 and 6.8 of Chapter 6 (quantitative data analysis). These findings also supported by interview findings discussed in Chapter 7.

1.4 The structure of the thesis

This thesis consists of eight chapters. Each of the chapters discusses different steps taken to conduct this research.

Chapter one is the thesis introduction. This chapter introduces the research frameworks, motivation, objectives, questions and hypotheses. The chapter also briefly summarizes the research methodology that highlights data collection and analysis. Then, it finally provides a short summary of the main findings of the research.

Chapter two is the first literature review chapter. This chapter discusses the literature surrounding the main research concepts of IC and BSC implementation. It defines the two concepts, their history of development and the main research issues around the two concepts. Then, the chapter will discuss the main theories that apply to the research concepts, which are IC and BSC implementation.

Chapter three is the second literature review chapter. In this chapter, the researcher continues reviewing the literature surrounding the main research concepts in order to link them with this study's research gap and hypotheses. The chapter also reviews the research variables under investigation and discusses their relationships based on the reviewed literature.

Chapter four is the research methodology chapter. The aim of this chapter is to discuss the research methods and design. The chapter consists of research methodology (quantitative versus qualitative approach), data collection methods, data collection instruments design, data analysis methods, research sample and research context.

Chapter five is the data descriptive analysis. The chapter starts with analysing the research sample in order to describe the participants' classification, sample size and response rate. Then the chapter provides the descriptive statistics for all the research variables under investigation including number of responses, ranges, means and standard deviations. Finally, the chapter tests the data for meeting SEM requirements, including the test for missing value, univariate and multi-variate outliers, homoscedasticity and multi-collinearity.

Chapter six is the quantitative data analysis section. This chapter provides a step-by-step process for analysing the quantitative data. It starts with the factor analysis in order to check the data collected suitability for measuring the proposed variables using collinearity and the outer weight test. Then it will move to a structural measurement model for testing all the proposed relationships. The chapter also discusses the results and compares them to the existing literature.

Chapter seven focuses on qualitative data analysis. This chapter describes the firms and participants that were interviewed. Then, using the thematic approach for qualitative data analysis the interview transcripts are divided into frameworks in order to discuss their link with the research hypotheses and link it with the questionnaire findings.

Chapter eight is the conclusion. This chapter summarizes the entire thesis in order to show all the research steps. It also discusses the theoretical and practical contributions and limitations, and it provides suggestions for future research.

CHAPTER TWO: LITERATURE REVIEW I

2.1 Introduction

This study covers two key concepts, which are IC and BSC implementation. From an accounting prospective, IC is defined as the hidden value of the assets (Roos and Roos, 1997) or as the difference between the market and book value of the firm (Dzinkowski, 1999). Others have defined it as the intellectual resources or knowledge the firm owns and they are used to create value (Stewart, 1997; Lynn, 1998). Considering the importance of these resources in value creation, scholars and practitioners engage in tools for resources management. One of the most common and the most widely implemented tools is the BSC (Malmi, 2001; Speckbacher et al., 2003). This management tool started as a measurement tool and then developed to become a strategic management tool (Kaplan and Norton, 1992; Kaplan and Norton, 2001b). Due to the importance of this tool, previous studies investigated its impact on firm CA and FP and found positive impact. Since, BSC is also considered one of the IC management tool, this study is investigating IC investment impact on BSC implementation and how this impact can affect both CA and FP.

The next section will provide a detailed literature review for the IC and BSC implementation concepts in order to explain how they emerge in the literature and what issues contribute to the development of these concepts. The IC literature shows the emergence of the concept in the literature, defining the concept, the consideration given to it in the accounting field, major components of IC and the most common IC measurement tools suggested by the literature. The BSC implementation literature will clarify the BSC concept, provide some definitions, discuss its types and components, and show its stages of development.

In order to discuss the issues under investigation, this chapter includes the two main sections. The first section discusses the key research concepts which are IC and BSC implementation. The second section highlights the key theories resource-based view and agency theory and how they applied to this research. The next chapter will discuss literature review with research gaps and hypotheses development for each of the three research frameworks.

2.2 The key research concepts

The two main research concepts for this study are IC and BSC implementation. As mentioned previously this section is discussing the important literature surrounding these two concepts. It is also highlighting the importance of these concepts, their development history and how researchers handle the issues surrounding them.

2.2.1 Intellectual capital (IC)

Galbraith (1969) is the first author to propose the concept of IC in his book *The New Industrial State*, as cited in JM Ferreira et al. (2013). He argues that IC clarifies the gap existing between firms' market and book values. IC as a concept that started to gain momentum in the early 1980s when firm managers and academic researchers in different parts of the world started to recognize the importance of the subject in determining their success (Sullivan, 2000). The literature provided many examples that show substantial IC values within different multinational firms. For example, the value of Netscape moved from $17 million to $3 billion in just one day after its initial offering was floated, and Microsoft experienced a dramatic increase in its share price by more than $100 per share after declaring the news about its Windows 95 operating systems (Edvinsson and Malone, 1997). It is also cited in Edvinsson and Malone (1997) that Lars Kolind, the president of a Danish hearing-aid maker which was valued in 1991 at 150 million Danish kroner and later jumped to 2.4 million in 1997, said that *'all of our accounting, all the rules of the government and stock exchange, all the resources, everything is focused on the equity, which is absolutely stupid because the 2 billion Danish kroner of intellectual capital is five times as high'* (p.4). In line with these examples, a US study by Wall et al. (2003) examined the relationship between the book values and acquisition prices of 391 firms. The average book value of those firms is $1.9 billion in the period between 1981 to 1993 and the average acquisition value is $4.4 billion. This proved that the balance sheet reported values of these firms were less than the half of the acquisition value (Wall et al., 2003). To add to the above findings, Itami (1980) presented his unique experience in the Japanese market that gave credit to the recognition and de-recognition of IC and resulted in performance differences between the Japanese firms. His experience was published in his first book entitled '*Mobilizing invisible Assets,*' which discussed how firms can manage their IC, as cited in

Mahoney (1995). Five years later, David Teece published his article entitled 'Profiting from Technological Innovation', which identified steps to extract value from innovation (Sullivan, 2000). The above evidence shows the contributions of IC toward a firm's value and highlights its overall importance.

The basis for IC is knowledge management, and as firms have more knowledge to manage, researchers and practitioners start to use different approaches to manage the resources related to knowledge. Strategic management, human resources management, and management accounting are the fields most involved in IC research. The research in these fields incorporated the importance of IC in enhancing firms' market values and CA (Barney, 2001). The resource-based-view (RBV) theory was the major contribution from the discipline of strategic management because it emphasized the importance of IC resources in building competitive business advantages (Barney, 1991). As the importance of these resources increased, managers were looking for ways and means to measure and manage them, as well as to report them in their financial reports in order to build/enhance CA. As this type of asset emerged, accounting practitioners were faced with difficulties in measuring and controlling these components of the new economy, such as human capital, intangible assets and knowledge (Stewart, 1994). The following sections of this chapter will be reviewing the emergence of issues relating to IC and its effects on firms' CA and performance.

2.2.1.1 IC definitions

There are terms commonly used interchangeably with IC among researchers and practitioners, such as intangibles, intangible assets, and knowledge capital (Gowthorpe, 2009). The literature review shows that there are different definitions for IC and there is not yet an agreed uniform definition or classification for IC (Stewart, 1994; Edvinsson and Malone, 1997; Sullivan, 1998; Wall et al., 2003; Fincham and Roslender, 2003).

Hall (1993) argues that it is very important to define intangible resources due to their importance in value creation and CA enhancement, both of which lead to a firm's success. Therefore, many definitions and classifications have been developed. Through a thorough literature review, this study classifies IC definitions into three groups, namely IC defined by listing what is considered as IC assets, IC defined from the accounting points of view and IC defined according to the process of management in order to create value. Each of these three types of IC definitions will be discussed separately.

The first group of definitions focuses on listing elements or components of IC. As an example, Edvinsson and Malone (1997) defined IC as the knowledge, experience, technology, relations with customers and staff capabilities that create competitive advantage (CA). They suggest that IC includes the resources that the firm doesn't account for and it remains in the firm when the staff leaves at the end of the day. The authors of this definition describe an intangible resource as a standalone object, and they did not describe its importance for the firm in totality. This definition also gives restriction to what is considered IC as the list does not show all IC elements. However, Hall (1993) suggested that IC can either be assets or skills. If it is intangible, it is something a firm possesses that can be considered as a skill or capability, and if it is something a firm possesses tangibly, it will be classified as an asset. However, not all IC elements can be easily classified as either assets or skills. For example, customer and supplier relations cannot be considered as owned by a companies, which makes it difficult for them to be classified under this definition. In line with the above definitions discussed, Brennan (2001) also defined IC as intangible assets such as copyrights, patents, franchises and intellectual property rights, which has a greater focus on legally protected IC.

The second group of IC definitions view the IC concept from the accounting perspective. The most commonly used definition is developed by Lev (2001). According to Lev (2001), all the intangible assets the firm owns shape its IC, which is considered the main source of future returns. Johnson and Kaplan (1987) went into more detail regarding the definition of intangible assets and stated that '*a company's economic value is not merely the sum of the values of its tangible assets, whether measurable at historic cost, replacement cost, or current market value prices. It also includes the value of intangible assets: the stock of innovative products, the knowledge of flexible and high-quality production processes, employee talent, and morals, customer loyalty and product awareness, reliable suppliers, efficient distribution networks and the like*'

(Johnson and Kaplan, 1987, p. 202). There are others who defined IC based on its components. For example, the Organization for Economic Cooperation and Development (OECD), Edvinsson and Malone (1997) and Abeysekera and Guthrie (2004) defined IC as the economic value of two types of intangible assets, which are organizational and human capital. Sveiby (1998) and Bontis (1999) applied the same approach of defining IC, but they separated it into three categories, i.e. human capital, structural and relational capital. Others define it according to its characteristics, such as Roos and Roos (1997), who defined IC as the hidden value of the assets that is not presented in full in the firm's balance sheet. On the basis of Roos and Roos (1997), many accounting scholars defined IC as the difference between the market and book values of the firm (Dzinkowski, 1999; Holland, 2006).

Finally, the third group of definitions explains the role of IC in firms' value creation and competitive advantage building. This group of definitions is mostly used by scholars that intend to explain and investigate the relationships between IC, CA and FP. Some early IC scholars defined IC in a way to describe the process of managing such resources or intangible assets (e.g. Stewart (1997); Lynn, (1998); Booth, (1998)). Stewart (1997) defined IC as intellectual materials, such as knowledge, information, experiences and intellectual property, that a firm can use to create value (Bontis, 1998). Similarly, Lynn (1998) defined IC as the knowledge accumulated in the firm which is then converted into valuable resources. Others such as Booth (1998) viewed IC as the firm's ability to transform new ideas into new products and services. From the above it can be concluded that IC represents a firm's intangible resources and it is used to create future economic value to the firm.

Moreover, Prusak defined IC as *'intellectual material that has been formalized, captured, and leveraged to produce higher-valued assets' (Stewart, 1994, p.68)*. This definition to some extent captures the process of making use of IC resources and the process of value creation. Further, Edvinsson (1997) defined IC as *'the possession of knowledge, applied experience, organizational technology, customer relationships, and professional skills that provides Skandia AFS with a competitive edge in the market'* (Edvinsson, 1997, p.368). This definition highlights the importance of IC in building firms' CA. The definition is rather comprehensive, covering the important aspects of IC, though missing out on some IC elements such as other relational aspects of IC, including supplier relationships, business collaborations, etc. The Intellectual Capital Management Group (ICM) also defined IC as the *'knowledge that can be converted into profits'* (Sullivan, 1998, p.35, Sullivan, 2000, p. 17). The term 'knowledge' used in the definition covered all IC related elements. The definition also linked IC to profit generation, though CA was not mentioned.

The previous definitions provide a clear description to IC resources and highlighted their importance for firm's value creation. Since, this study follows the management prospective and proposes to investigate the IC impact on both CA and FP, the definition provided by Edvinsson (1997) is the most relevant definition for IC.

After reviewing the IC definitions in the previous literature, the next section will discuss how IC components are classified in the literature. This classification helps to link this research to management accounting field.

2.2.1.2 IC classification

In addition to the IC definitions reviewed in the last section, IC has been classified into different categories in the literature. Understanding the categories of IC helps us to better understand what IC is, and it allows firms to measure, manage and report on IC to their stakeholders (Bontis, 1998).

For example, Brooking (1996) classified IC into four categories, which are market assets, intellectual property, infrastructure and human capital. Edvinsson and Malone (1997) and Dzinkowski (2000) viewed IC to be formed by three categories, i.e. human, organizational and customer capital. Similarly, Youndt et al. (2004) and Reed et al. (2006) categorized IC into three categories, namely human, organizational and social capital. The authors used the term 'social capital' instead of 'customer capital', arguing that the phrase social capital is more comprehensive than customer capital, and it represents all relationships with the firm's stakeholders.

Another classification was added by Van der Meer-Kooistra and Zijlstra (2001), who categorized IC into four categories, namely, human elements, customer, process and innovation. They argue that both human and customer capital involve the people element, of which it is difficult to claim ownership. Fincham and Roslender (2003) classified IC into similar four categories, though using different terms: i.e. human abilities, internal organizational structure, external structure and innovative capabilities. They argue that there can be overlaps between the different categories in this classification; for example, one can say that internal organization structure can include human abilities, and innovative capabilities can be part of both human abilities and internal organizational structure, which reflects the complexity of IC concept.

The Brooking Institution Report, cited in Guthrie et al. (2001), classified IC from another angle, i.e. by its mobility and the firm's ability to control/trade it. In the report, IC is classified into mobile intangibles with property rights, immobile intangibles which are controlled by the firm without legal property rights and intangibles that are less controllable and non-tradable, such as human capital. This classification unveils one of the most commonly cited reasons for managerial resistance towards disclosing many IC elements (Ashton, 2005) and the difficulty in reporting IC items on a company's balance sheet, in that IC contains resources/items that may be difficult for a company to control and claim ownership over.

Whilst there isn't yet an agreed classification of IC, the literature has reached some consensus in the three key categories of IC, namely, human capital (HC), structural capital (SC) and relational capital (RC) (e.g. Bontis, 2001; Meritum, 2002; Tayles et al., 2007; Edvinsson, 2013). This classification gave specific consideration to different IC elements and their effects on a FP. Lev and Sougiannis (1996) found that R&D, as one of the important elements of IC, was the major reason for a firm's continuous growth, especially in the stock market. R&D's effect on book-to-market ratio is also found to be higher for firms with low book-to-market ratios, and vice versa (Lev and Sougiannis, 1999). Amir and Lev (1996) also found that R&D and technology related expenses may lead to economic growth, and they recommended the capitalization of these expenses in order to show a better picture of firms' assets and to enhance their future growth. The use of computer technology in different parts of a business has also been considered as an element of IC. In the current knowledge-based economy, this lead to an increased investment in intangibles, with investment in computer technology such as software, growing ever faster. Compare to the above, Stewart (1997) also classified IC into the three categories, though customer capital was placed as a subcategory of structural capital.

Further to the classification of IC, Edvinsson (1997) emphasised that IC components do not work isolated, but the value of IC is created by the interaction of its main components. For example, human capital is the foundation for constructing a firm’s structural capital, which in turn interacts to produce relational capital. On the other hand, human capital needs the structural capital to facilitate their value creation and the realisation of relational capital. It is therefore argued by Wall et al. (2003) that the more the IC components interact, the more value they produce (Wall et al., 2003).

All the above classifications agreed with the intangibility characteristics of IC, but this study agreed with the classification given in Bontis (2001), as the term ‘organizational’ is more general than ‘structural’ to define the internal process, and the term ‘relational’ is clearer than ‘social’ in explaining firms’ relationships with different stakeholders. It is argued that the three IC components should work together in order to enhance a firm’s IC and create value (Youndt et al., 2004; Reed et al., 2006), whilst others such as Habersam and Piper (2003) propose the fourth category of IC, i.e. connectivity capital.

Based on the above review, this study takes the consensus of the literature and adopts the three-category classification of IC, i.e. human, structural and relational capital.

2.2.1.2 Intellectual capital accounting considerations

The first accounting book that dealt with double-entry bookkeeping was published by Luca Pacioli in 1494, and without his work, business organizations would have struggled to manage both production and financial flow streams (Stewart, 1994). With advancement of technology, businesses and the economy, this book has been argued to have become less relevant in the modern day. This is primarily because businesses moved from product-based to knowledge-based types of activities and most businesses have started to have more intangible than tangible assets. This has led to questions over the relevance of the traditional accounting model, which facilitated firms' operations for half a millennium, in that it is considered to be unable to handle the modern business requirements (Edvinsson and Malone, 1997).

The traditional accounting system has been criticized for its inability to include sufficient information about intangible assets in the annual report (Gowthorpe, 2009). The phrase 'intangible asset' is a synonym of IC, which was used extensively in the traditional accounting system. The critique to the traditional accounting system started a long time ago when a practitioner noticed that there is a difference between the book value and market value of firms. This difference was previously known as goodwill, and then based on this finding a question was raised about how relevant accounting numbers are to decision making (Power, 2001). From this point, the research focus has been directed towards understanding the difference in the market and book values, and how to reduce this gap.

Stewart (1994) reported that the first company to manage IC was CIBC Bank, and this helped them to change their human resources strategy and shape up their operation. Moreover, he reported that the first company that issued financial reports with IC information was the Skandia Group. Stewart (1997) emphasized the fact that these two companies' experience along with others in managing and reporting IC show that IC can be identified, measured, and managed to improve financial performance.

In 1991, the committee formed by the American Institute of Certified Public Accountants (AICPA) studied the growing discussion on the usefulness of the current reporting and disclosure systems, and this committee found that there is a need for improvement in the provision of information on firms' future and current situations. It also encouraged the inclusion of non-financial performance variables that relate to the intangible assets with ability to create long-term value (Edvinsson and Malone, 1997).

There has been progress made on IC research in the accounting discipline. The main focus of the previous literature has been on IC reporting and disclosure issues through the use of content analysis (Brennan, 2001; Abeysekera and Guthrie, 2005; Vivien and Jane, 2007; Campbell and Abdul

Rahman, 2010; Cohen et al., 2012; Guthrie et al., 2012; Guthrie, 2014). However, there are other types of research on IC that are linked to both finance and management accounting disciplines, which focus on testing the impact of IC on firms' CA and performance (Joshi et al., 2010; Murthy and Mouritsen, 2011; Alcaniz et al., 2011; Muhammad and Ismail, 2014). Research on IC has also attracted attention from different disciplines such as management (Sharabati et al., 2010; Martín-de-Castro et al., 2011; Hsu and Wang, 2012; Lu et al., 2014), IT and knowledge management (Alipour, 2012; Costa, 2012; Wang et al., 2014; Curado et al., 2014), and marketing (Bharadwaj et al., 1993; Anderson et al., 1994; Fang et al., 2011) that have investigated the association between marketing related elements of IC and FP. Whilst many of the previous studies examined the relation between IC and FP, very few of them looked at the overall picture of IC in relation to FP (Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007).

Due to the importance of IC in a firm's value creation and the difficulties in measuring such valuable resources (Bontis, 2001; Sveiby, 2010), IC literature in the management accounting discipline focused on developing measurement tools/frameworks to help firms measure these resources (e.g. Edvinsson, 1997; Bontis, 2001). One of these measurement tools is BSC. So, due to BSC importance in IC management (Kaplan and Norton, 2004), further review on the relationships between IC, CA, BSC implementation, the success in BSC implementation and FP will be provided in Chapter 3.

2.2.1.3 Intellectual capital measurement

The field of IC has always been associated with a measurement problem, resulting in difficulties in managing such resources and in reporting IC information to the stakeholders. With the issue of managing, measuring and recognizing IC becoming an international affair, different nations and companies are looking for the right framework that can help them to tackle the issue. This has led to the development of different tools to manage, measure and report IC (Fincham and Roslender, 2003).

IC measurement issues were examined from different angles: the (1) non-financial performance measurement impact on FP (Hoque, 2005; Coram et al.,

2011) and (2) discussing the impact of using different measurement tools on FP (Hoque and James, 2000; Davis and Albright, 2004), but without linking the two issues with IC measurement. IC measurement was always seen as important for any firm, as it helps in assessing FP in important areas such as quality improvement, customer service and satisfaction, profit growth, sales and work efficiency. Kaplan and Norton support performance measurement and argue that in the past, growth and efficiency were the major concerns for many firms due to their focus on financial performance measures only (Kaplan and Norton, 1996c).

It is clear from the existing literature that almost all the IC measurement tools were established before 2001. Many studies focused on identifying and describing the effectiveness of these measurement tools in meeting stakeholders' expectations (Bontis, 2001; Wall et al., 2003; Fincham and Roslender, 2003; Edvinsson and Malone, 1997). Despite the effort of various studies in developing frameworks, it is argued by many that there was no perfect model to measure IC (Bontis, 2001). Further, the discontinuity of research can be explained by the difficulties encountered with IC measurement due to the intangibility of the resources and the use of non-financial measures (Ashton, 2005).

Not all IC components are financially measured, reported in the financial statements, and the overall value of a firm's IC was not fully recognized in the firm's balance sheet. A number of metrics/measurement frameworks to measure and manage IC has been developed. Andriessen (2004) and Sveiby (2010) identified more than 40 IC measurement and management tools. Edvinsson (1997) and Bontis (2001) classified these tools into three types according to their functions and purposes of use, which are (1) the tools to calculate the overall monetary value of the firm's IC, (2) the performance measurement tools used to measure different IC elements in order to create and enhance a firm's CA and performance and (3) the tools focused on measuring human capital elements only. Based on all the above classifications, Sveiby (2010) also suggested four groups of IC measurements tools: direct intellectual capital, scorecards, market capitalization and return on assets. There is benefit identified from applying the IC measures that fall under Sveiby classification of scorecard and direct intellectual methods. These tools are argued to provide a more comprehensive picture of firms' overall performance than the one provided by the traditional financial metrics (Sveiby, 2010). Another classification was provided by Sudarsanam and Marr (2005), who classified IC measurement tools into two types: (1) tools to estimate the overall value of IC and (2) tools to measure firms' investment in different IC elements.

Due to this study's focus on BSC implementation, the review in the rest of this chapter will concentrate on evaluating the commonly used techniques without disregarding the importance of other practical models developed based on the Skandia Navigator model (Bontis et al., 1999). The most commonly used and well known IC measurement models have been classified into three types: (i) placing value on different IC elements, (ii) focusing on calculating the value of IC by subtracting the book value from the market value and (iii) focusing on human capital as the main source of IC (Wall et al., 2003). The first and the third types use both a financial and non-financial performance factor to measure IC, and they cannot be used to compare FP because different companies can use their own performance measurement frameworks like the BSC, Skandia, the asset value of skill methods and human resource accounting (Bontis, 2001; Wall et al., 2003; Fincham and Roslender, 2003). The second type uses financial measures to measure the overall value of IC. However, the calculated value does not always represent IC because the model does not consider non-financial factors that contribute to both CA and FP (Edvinsson and Malone, 1997; Wall et al., 2003).

IC measurement models have received various criticisms. Take the overall IC value measure (i.e. the second measure identified in Wall et al., 2003) as an example. The measure has been argued to not only represent the intangible assets but also unrecognized tangibles in the balance sheet given that the balance sheet has been argued to be understated. There are also problems related to fluctuating share prices, which might lead to unreliable measures of IC. Further, the overall calculated IC value does not take all IC elements into consideration (Brennan, 2001; Bontis, 2001; Wall et al., 2003). The literature also identified a problem associated with human capital performance measures in that they are considered to be time consuming and that the measures can be misused (Wall et al., 2003). Hauser and Katz (1998) found that companies are always affected by the performance measure they use, in that only the performance measured will be reflected in their normal activities.

BSC is considered one of the most common IC measurement frameworks that is implemented worldwide (Malmi, 2001; Speckbacher et al., 2003). In addition, to the BSC being one of the most commonly discussed, studied, and applied performance and IC measurement frameworks, it has also been subject to criticisms (Bontis, 1998, 2001). It is argued that the BSC framework restricts firms' choice over the aspects that need to be measured to the four perspectives specified (see e.g. Kaplan and Norton, 1992), which could result in some important aspects being neglected. Some also argue that staff as an important element of IC should be separated from learning and growth and be designed in the framework as a separate perspective (e.g. Bontis, 1998, 2001). Bontis (1998, 2001) also considers the classification of innovation under an internal process to be problematic as it can be associated with both internal and external factors. In addition, whilst it is argued that the cause-and-effect relationship between the four perspectives within the BSC makes it different from other IC measurement systems as it facilitates the use of financial and non-financial measures (Kaplan and Norton, 1996a), others argue that the BSC assumed finality instead of causality, making the model indifferent from others (Norreklit, 2000).

The literature shows that the BSC is the most widely used performance measure among European countries (e.g. Speckbacher et al., 2003; Malmi, 2001). However, Speckbacher et al. (2003) found that none of the sampled companies used it for IC measurement. Whilst the framework was not originally designed for IC measurement, it is composed of a combination of financial and non-financial measures (Kaplan and Norton, 1992; Kaplan et al., 1996; Kaplan and Norton, 2001b) and Kaplan and Norton (2004) highlighted the link between IC and the non-financial performance measures in BSC, which were considered to be measures for intangible values that were difficult to measure through financial means.

Moreover, from reviewing the performance measurement literature, Andriesson (2004) identified seven reasons for measuring IC, which are to improve IC management, to focus management's attention, to weigh the course of action, to base strategy on resources, to translate strategies to actions, to monitor effects of actions, and to enhance the management of the entire business. This study considers BSC as an IC measurement framework and intends to examine its impact in relation with IC level, factors that affect BSC implementation and how BSC can affect firms' competitiveness and performance. The next section discusses the development and use of BSC.

2.2.2 Balanced scorecard (BSC)

The initial idea of BSC was developed in the 1950s from a General Electric performance management work (Drucker, 1988). At the beginning of the 20th century, a French engineer invented a similar model for performance measurement called *tableau de bord*, which is better known as an ‘instrument panel’ or a ‘dashboard’ (Bourguignon et al., 2004). Then based on their work, the main concept of BSC was initiated by Robert Kaplan, an accounting professor at Harvard Business School, in the 1990s, and David Norton, a consultant from Boston, Massachusetts, who worked for Renaissance Solutions Inc (Johnson and Kaplan, 1987). The concept was fine-tuned by Robert Kaplan and David Norton in the 1990s, which helped solve the problem of traditional accounting with historical information and added value relevant non-financial information, in order to address the recent economic developments that gave more weight to IC investment and management (Kaplan and Norton, 1992, Kaplan et al., 1996).

Due to the inconsistency in BSC implementation across firms, and the complexity in its implementation, little attempts were made to define it. Previously, there were attempts made to define BSC by describing its components (Malmi, 2001) or describe it by its stages of development (Speckbacher et al., 2003). A recent study defined BSC as *‘a strategic planning and management system that is used extensively in business and industry, government, and non-profit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals*’ (Grigoroudis et al., 2012, p. 104). BSC definitions mainly focus on the use of BSC as measurement or management tool for both financial and non-financial performance.

The BSC started as a performance measurement tool that succeeded in aligning the strategic non-financial performance measures with the traditional financial metrics in order to help managers and executives balance their organizational performance (Kaplan and Norton, 1992, 1993). The concept was then developed further to become a strategic management tool (Kaplan and Norton, 1992, 1993, 1996a-c, 2001a-b, 2004, 2006, 2013; Kaplan et al., 2010).

The literature shows evidence that the implementation of BSC differs from one firm to another (Malmi, 2001; Speckbacher et al., 2003), in terms of its components or the stage of implementation. Kaplan and Norton (1993) argue that the differences in BSC implementation were due to firms' inconsistency in selecting their required BSC perspectives and performance measures. Speckbacher et al. (2003), on the other hand, classified the BSC into three types according to its components. The first type is described as a strategic performance measurement system that includes financial and non-financial strategic measures which are grouped into four different perspectives: financial, customer, internal learning process, and learning and growth. The second type is the same as the first one but describes and links firms' strategies using a cause-and-effect relationship in order to link tangible and intangible resources together. Finally, the third type is the same as the second type but implements firms' strategies through action plans, and it links target achievements with incentive plans.

The literature above explained the three important stages of BSC development and shows that the most developed BSC framework is the one that links BSC implementation to the firm's strategic plan (Speckbacher et al., 2003; Kaplan and Norton, 2004; Hoque, 2014). Firms have been suggested to consider the following issues during BSC implementation: (1) strategies are divided into four perspectives, (2) both financial and non-financial strategic measures linked with the cause-and-effect relationship to measure strategic achievements, and a (3) target for each measure achievement or key performance indicators (KPI) linked with incentive plan in order to motivate target achievements (Kaplan and Norton, 1992, 1996c, 2001b, 2004, 2006, 2008, 2013; Kaplan et al., 1996; Kaplan and David, 2001; Kaplan et al., 2010; Kaplan et al., 2012,).

The studies conducted to examine the diffusion of the tool worldwide prove that the BSC's use is growing very fast (Silk, 1998; Malmi, 2001; Nilsson and Kald, 2002; Speckbacher et al., 2003; Ax and Bjørnenak, 2005; Nielsen and Sorensen, 2004). For example, Silk (1998) found that about 60 percent of the US

Fortune 1000 firms were either implementing or started to experiment with BSC within their firms. In the Swedish market, Nilsson and Kald (2002) found that 27% of the included firms had already implemented BSC, and 34% were expected to implement BSC within two years. Speckbacher et al. (2003) also found that most firms in German speaking countries first came in contact with the BSC concept in the period between 1996–1999 with some companies starting to use BSC in the period between 1992–1995. The literature also shows that there were BSC implementation initiatives in different countries around the world, e.g. China and Japan (e.g. Chen et al., 2006), Malaysia (e.g. Othman et al., 2006), Africa (e.g. Waweru et al., 2004), and Canada (e.g. Van Grembergen et al., 2003). BSC was implemented in both private and public sectors, and both sectors showed positive attitudes toward the implementation.

Due to the fast diffusion of BSC around the world, some studies examined the impact BSC had on firm performance (e.g. Hoque and James, 2000; Davis and Albright, 2004), whilst others focused on understanding different purpose BSC was implemented for (e.g. Malmi, 2001; Speckbacher et al., 2003). Some of these purposes are for IC management, strategic management or performance measurement. In terms of the impact of BSC on firm performance, the findings were mixed. Whilst most of the previous studies showed that BSC implementation has a positive impact (e.g.Hoque and James, 2000; Davis and Albright, 2004; De Geuser et al., 2009), others found the relationship to be negative (Ittner et al., 2003; Zeng and Luo, 2013). Due to this, many studies focused on understanding how it is implemented at different industries or sectors (Fernandes et al., 2006; Bhagwat and Sharma, 2007; Wynder, 2010; Chen et al., 2011; Amado et al., 2012; Lin et al., 2013). Despite the number of studies examining BSC implementation related issues, there was limited research that links BSC implementation with IC measurement, success of BSC implementation, and investigates the factors that can affect this success, as well as how this success can lead to better FP. Therefore, this study aims to fill this gap by (i) studying the impact of IC measurement through BSC implementation on a firm's CA and performance and (ii) studying the factors that affect BSC implementation success and how the success can lead to better performance. The next chapter will continue discussing the two research concepts but provide more detail in order to link them with this study’s research gaps and hypotheses.

In terms of the theoretical aspects of the suggested topics on IC measurement and BSC implementation, they can both be linked to the resource-based view (RBV) and agency theories, which are discussed in the sections below.

2.3 Key theoretical perspectives

As mentioned earlier, the main theories applied to this research are RBV and agency theories. The RBV describes the firm as a bundle of resources, capabilities and competences that a firm manages to gain CA (Barney, 1991; Peteraf, 1993; Barney and Arikan, 2001; Helfat and Peteraf, 2003). The RBV theory is linked to IC accumulation and management in order to enhance a firm's CA (Reed et al., 2006; Ittner, 2008). To test this theory, this study proposes the use of the holistic picture of IC instead of IC components or sub components to find out whether firms with high IC are associated with high CA and performance. This study can also test the assumption of RBV theory about resource management and its contribution to building/enhancing CA, by examining the impact of BSC implementation as an IC management tool on firms' CA and performance. The IC management is also linked to the agency theory. In that, the managers (the agent) are managing the IC resources using BSC or any other tools in order to increase shareholders' (principals') wealth (Hoque and James, 2000).

The next section will discuss the development of the applied theories and show how they can be linked to each of the research topics discussed above.

2.3.1 The RBV theory

The basic concept of the RBV theory started with examining the effect of different resources on FP (Penrose, 1959). Then the theory developed further to assume that there are specific resources that contribute to a firm's CA, and specific criteria are provided to identify these resources (Barney, 1991; Barney and Arikan, 2001). Moreover, the RBV theory is extended further to accommodate the dynamic capabilities view (Helfat and Peteraf, 2003), competencies view (Javidan, 1998), and knowledge-based view (Grant, 1996; Felin and Hesterly, 2007). This research will test whether resource accumulation and management can enhance a firm's CA. Therefore, the next section will discuss the development of RBV theory, how it is linked to firms' CA, how it is linked to IC and how IC management can contribute to CA.

2.3.1.1 The RBV and firm competitive advantage

Penrose (1959) describes firms' aggregations of resources which are diversely distributed within firms and are costly to transfer across firms. The author refers to the effect of these resources on the firm's performance as the 'resource-based view (RBV)' of firms. Although Penrose's work on RBV was published in 1959, scholars did not refer to her work until 1991 when Barney (1991) discussed the role of strategic resources in building a firm's CA. It is also argued in Barney (1991) that the RBV can be regarded as a substitute for other CA models, such as Porter's (1980) five forces and Shapiro's (1989) strategic conflict model, both of which identify industry growth requirements and attitudes and present how industry competitiveness can be enhanced. RBV differs from the other frameworks by focusing on strategic resources at the firm level rather than the industry level.

The work of *The Theory of Growth of the Firm* by Penrose (1959) is seen by many as the foundation of the development in the RBV theory (Barney, 1991; Peteraf, 1993; Lockett and Thompson, 2004; Lockett, 2005). In contrast to this, others like Rugman and Verbeke (2002, 2004) argue that the above scholars misinterpret Penrose's work, so her work was not considered the primary base for developing the RBV theory. They claimed that Penrose never intended to provide managers with useful strategy prescriptions to produce sustainable flow of profit. Instead she provided a description of a firm's growth process, and in general she assumed that profit will not occur. She also assumed that if profit occurs, it shows an efficient macro-level outcome as a result of an efficient micro-level growth process. They also argue that her ideas certainly motivated 'good conversations' within the strategic management field, specifically the work produced by Mahoney and Pandian (1992). Arguments made in Mahoney and Pandian (1992) have been used by others (e.g. Youndt et al., 2004; Tayles et al., 2007) as the foundation for the theoretical developments in the areas of CA and profit generation.

Other emerged theories, including the dynamic capabilities view (Helfat and Peteraf, 2003), competencies view (Javidan, 1998) and knowledge-based view (Grant, 1996; Felin and Hesterly, 2007; Gassmann and Keupp, 2007), are considered as extensions to RBV. Some argue that the dynamic capabilities view theory is more effective than RBV in explaining a firm's CA (Teece, 1998; Eisenhardt and Martin, 2000; Deeds et al., 2000; Makadok, 2001; Teece, 2007; Zott, 2003; Barreto, 2010; Prange and Verdier, 2011). Regardless of its origin or support from the literature, RBV has become one of the main theories for discussing firms' CA and performance.

RBV of the firm is a theory that assumes a firm is a bundle of resources, capabilities and competencies which is considered the fundamental determinants of its CA and performance (Penrose, 1995; Wernerfelt, 1984; Prahalad and Hamel, 1990; Barney, 1991; Barney, 2001; Hitt et al., 2001; Peteraf and Barney, 2003; Wade and Hulland, 2004; Lavie, 2006; Newbert, 2007, 2008; Lockett et al., 2009; Boyd et al., 2010; Hart and Dowell, 2011; Ou et al., 2012; Lockett and Wild, 2013; Lin and Wu, 2014). According to RBV, a firm can gain sustained CA if the resource it owns and controls is valuable, rare, imperfectly imitable, not substitutable (VRIN) and heterogeneous (Penrose, 1959; Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). These descriptions gave indication that all resources that meet these criteria can be considered sources or determinants of CA.

RBV has been used in previous studies to underpin their research (e.g. Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007; Newbert, 2008). Newbert (2008) examined how the value and rareness of resources relate to a firm's CA. The finding shows that the value and rareness of the resources the firm owns or controls are related to their CA and FP. Lin and Wu (2014) show that the accumulation of VRIN resources improves a firm's CA and performance. However, Teece (1998) argues that RBV describes the nature of the resources that create CA, but it does not show which resources have more sustainable competitive advantage than others. Currently, regardless of RBV original considerations or supporting thoughts, the RBV theory is considered the most important in discussing FP and CA relationship. Therefore, along with the above studies, this study aims to assess the effect of these valuable resources, on firms'

CA. However, it will be different by combining the available resources in the firms and finding their accumulated effects on CA. The next section will discuss the link between IC and the theory.

2.3.1.2 The RBV theory and intellectual capital

Makadok (2001) refers to RBV theory as the 'resource-picking' theory. Many argue that the resources that match with the criteria described by Barney (1991) are only intangible resources or the resources known today as IC (Amit and Schoemaker, 1993; Meso and Smith, 2000; Barney, 2001; Sanchez, 2004). Barney (1991) described these resources as a combination of tangible and intangible assets. He argued that they include management skills, knowledge and information that firms control and a firm's routines and processes. Moreover, Penrose's (1959) RBV of the firm has been used and suggested as a theory that can explain the IC resource characteristics and their expected results (Johnson, 1999; Carlucci et al., 2004; Menor et al., 2007). The resources described by RBV can be classified into, e.g., physical and human resources (Penrose, 1959), tradable and non-tradable assets (Dierickx and Cool, 1989), tangible and intangible assets (Barney, 1991, 2001), strategic intangible resources (Amit and Schoemaker, 1993), and strategic and non-strategic resources (Meso and Smith, 2000), many of which touch upon intangible resources in line with the characteristics of IC. Further, Villalonga (2004) argues that the greater the intangibility of the resources the firm owned, the greater the sustainability of the CA.

Penrose (1959) argues that in order to get the expected benefit from the firm's valuable resources, an effective combination has to be applied. This gives an indication that different IC components need to be combined effectively according to the firm's requirements in order to achieve the proposed advantage (Youndt et al., 2004; Reed et al., 2006; Axtle-Ortiz, 2013). Moreover, firms can generate profit not only by selecting better resources than the competitors, but also by taking advantage of utilizing these resources more effectively than the competitors (Makadok, 2001; Reed et al., 2006).

Therefore, this study will test the RBV theory by investigating the impact of the whole value of IC components on firms' CA and performance. This work will be an extension to the work started by Youndt et al. (2004), Reed et al. (2006), Tayles et al. (2007), and Kamukama et al. (2011). These studies tested the RBV theory by using all IC components to investigate their impact on CA and FP, but none of them investigated their impact in connection with IC management or BSC implementation. This study aims to fill this gap by testing the theory and investigating the impact of a more holistic form of IC on both CA and FP.

2.3.1.3 The RBV theory and resource management

The resource management theory has been considered as an extension of the RBV theory. Barney and Arikan (2001) argue that Barney's (1991) work was not completed and more work and actions are required for the RBV theory to explain the ways firms can gain CA. Many critique the RBV theory for its lack of explanations of the process through which the resources impact FP (Ketchen et al., 2007; Sirmon et al., 2007; Crook et al., 2008).

Sirmon et al. (2007) argue that RBV needs further development to illustrate the link between resources management and value creation. They defined resource management as 'the comprehensive process of structuring, bundling, and leveraging the firm's resources with the purpose of creating value for customers and CA for the firm' (Sirmon et al., 2007, p. 273). As an extension to the above work, Sirmon et al. (2008) added that in spite of the advantages firms can earn from their stock of resources, only the resources that are managed effectively will contribute to their CA.

The ownership or the accessibility of VRIN resources is important for value creation that leads to better CA, but it is not enough for complete the value creation. Many theorists argue that these resources must bundled and deployed effectively by the firm in order to gain the expected CA (Hansen et al., 2004; Kor and Mahoney, 2005; Lavie, 2006). The way these resources are bundled and deployed have been integrated within the resource management theory which is considered to be an extension of the RBV theory (Sirmon et al., 2007). In spite of its importance in resource management, the theory did not provide enough explanation on how resources can be managed in order to achieve the proposed CA.

This study examines the effect of the BSC as a resource management tool on the relation between strategic resources (VRIN) and a firm's CA. To support the theory, this study also intended to examine if firms with more strategic resources are more likely to implement a management tool such as BSC in order to manage their existing resources and gain the proposed competitive advantage.

2.3.2 Agency theory

Agency theory is the second most applied theory to the research topic of this study. This theory discusses the relationship between the owner and the managers of the firm. The theory emerged from the work of Berle and Means (1932), who studied the separation of large North American firms' control and ownership. Since that time, a huge amount of literature has been directed to studying the relation between shareholders and the management of firms, which is known as the agency relationship. Baiman (1990) stated that agency relationship exists when one or a group of individuals, called the principal (owner), recruit others, called the agent (managers), in order to delegate the firm's management responsibility to them. This delegation of responsibility is regulated by the employment contract that specifies the rights and responsibilities of the agent. The contract also specifies the agent's salary and incentives, duties and description of the principal's rights and responsibilities. The principal in this relation is the owner of the firm who provides the capital, bears the financial risk and is represented by the firm's shareholders who delegate their work to managers (Davis et al., 2004).

This study focuses on the relationship between owners and managers. The managers here are involved with resource measurement and management in order to increase owners' wealth. The agency theorists assume that both owners and managers are fully rational and self-motivated, with a willingness to increase income with less effort. Additionally, each one of the owner or manager has defined preferences (Jensen and Meckling, 1976). The theory also assumes that managers always prefer to work less and avoid risk, while shareholders are assumed risk-neutral (Fama, 1980; Eisenhardt, 1989). The theorists refer to this conflict of interest as 'agency problems'. Based on these conflicts, the standard agency theory faced much criticism due to its human behaviour assumption, which created conflict or rivalry of thought between different disciplines like psychology and sociology (Kunz and Pfaff, 2002).

Agency theory links to this research through the concept of IC management. When managers are managing IC, the most important resources of the firm, they increase the shareholders' wealth. Managing such resources using BSC and implementing it at different business units will also reduce information asymmetry because it will provide shareholders with more information which is not provided in the financial reports. Moreover, when firms link incentives with BSC implementation, agents (managers) will become more productive and that will lead to better FP and accordingly will result in more shareholder wealth. The next section will discuss how agency problems are reduced through IC management and BSC implementation.

2.3.2.2 The agency theory, intellectual capital, and balanced scorecard implementation

According to agency theory (Jensen and Meckling, 1976; Fama, 1980; Eisenhardt, 1989; Jensen and Meckling, 1994; Kunz and Pfaff, 2002), the principals (the owners) provide the agent (managers) with employment agreements or a contract, which can then be used in order to maximize owners' wealth. The managers of the firms receive compensation from the firm's owners in return. As a result of the compensation the staff receives, the staff will work hard to increase the owners' wealth by increasing shareholders' value. This in return increases the owners' wealth, and the staff will be rewarded bonuses, increases in salary or job promotions. In the scope of the contract conditions and the authority given by the owners, the managers do their best to enhance the firm's competitiveness among its rivals in order to enhance overall performance (Coff, 1999). Otley (2003) also refers to the central problem of performance measurement as being how the firm or its owners ensure that managers work toward the firm's and its owners' interest.

Agency theory implies that if managers do not carry out their responsibilities toward the effective management of IC, FP will suffer. Managers will be penalized due to the decline of FP, according to the principal-agent contract (Tosi Jr and Gomez-Mejia, 1989; Kunz and Pfaff, 2002). Further, given the importance of IC in building CA and enhancing FP, reporting of IC information to stakeholders has been argued to be value relevant (Van der Meer-Kooistra and Zijlstra, 2001; Brennan, 2001; Fincham and Roslender, 2003; Bukh et al., 2005). However, both financial and management accounting literature shows that it is difficult to measure IC in monetary value and to report it in a firm's financial reports. Hence, it is argued that there is not enough IC information provided for stakeholders (Van der Meer-Kooistra and Zijlstra, 2001; Fincham and Roslender, 2003). Kunz and Pfaff (2002) argue that the lack of information about IC created an information asymmetry problem that is considered as one of the agency theory problems, and there are costs involved in order to reduce such impact.

Therefore, and in order to reduce the impact of the information asymmetry problem, agency theory is linked with the performance measurement concept, so managers are rewarded according to their performance (Tosi Jr and Gomez-Mejia, 1989; Indjejikian, 1999; Kunz and Pfaff, 2002), and they can make sure that what gets measured is always managed (Kaplan and Norton, 1992). The performance measures were classified as financial and non-financial. The literature review shows that the agency theory was used regularly in both BSC and performance measurement research (Otley, 1999). The theory is also found to dominate most of the research that study the relationship between firms' incentive plans and performance measurement (Bloom and Milkovich, 1998). The non-financial performance measurement in the BSC can provide a link to IC measurement or management that agency theorists have found to be positively related to FP. For example, Banker et al. (1996) found that there is a continuous increase in organization sales after implementing a sales-based performance plan. The study conducted by Banker et al. (2000) provided another form of evidence that there is a positive relationship between non-financial performance management and a firm's future financial performance. The implementation of an incentive plan based on non-financial performance leads to an improvement in both financial and non-financial performance (Ittner and Larcker, 1998). These findings lead to a conclusion that managers' use a non-financial performance measurement (i.e. IC measurement) in order to enhance shareholders' wealth. This provides another link between IC, IC measurement and agency theory.

Overall, as discussed above, this study integrates both RBV and agency theories in supporting the main research framework presented in Figure 1.3. The framework links both IC and IC management in investigating their impact on firm CA and performance. The RBV focuses on IC resource investment and management for stronger CA which then enhances FP. On the other hand, agency theory focuses on reducing the conflicts of interests between the agent and principal, through for instance putting in measures such as BSC to allow incentives for the agent to be linked with indicators given in the BSC (i.e. bonding purpose), and for information to be made available to the principal to monitor the agent’s performance. RBV and agency theories are linked together by IC resource investment and management, with a view to enhance CA and FP for the former, and to reduce agency problems for the latter.

2.3.3.2 Agency theory and intrinsic motivation

As stated earlier, the agency theory states that the industrial relationship is dominated by distrust between the owner and staff (Frey, 1997). Based on that, there was an extensive focus on the owner's need to monitor and control the staff. However, Shapiro and Stiglitz (1984) argue that staff monitoring can lead to negative sanctions, especially related to dismissal or staff resignation. To minimize the impact of control and monitoring on staff productivity, agency theory contends that the increase in performance pay incentives, while keeping other factors constant, has a positive impact on staff productivity when omitting the consideration of risk (Tosi et al., 1997; Kunz and Pfaff, 2002). Lazear (2000) also found that performance pay applied by the satellite firm has a noticeable impact on attracting better staff to join and enhance productivity. He found that there is a 44 percent increase in staff productivity after the implementation of a compensation system. This evidence supports the importance of performance pay incentives on staff productivity.

However, the intrinsic motivation concept has contradicting views with the agency theory. The concept asserts that owners can be worse off when making an incentive contract with staff as opposed to a normal contract (Frey, 1997; Kunz and Pfaff, 2002). Tosi Jr and Gomez-Mejia (1989) argue that performance pay incentives undermine staff intrinsic motivation. Deci et al. (1999) also found that tangible rewards undermine adults' intrinsic motivation. The concept of intrinsic motivation shows extensive diffusion to the business administration and economic fields. Therefore, practical and theoretical literature shows a clear shift in understanding the link between the formal agency theory and performance pay and how this impact on staff intrinsic motivation (Osterloh and Frey, 2000; Tosi et al., 1997). The above evidence shows the impact of incentives or external motivation on intrinsic motivation and on enhancing FP, so this highlight the need for incorporating both intrinsic and extrinsic types of motivation into agency theory (Frey, 1997). Osterloh and Frey (2000) criticized the dominance of monetary rewards in a firm's compensation plans, so based on that they recommend stronger intrinsic plan that seen as unexplored CA for firms. In line with the above, Kunz and Pfaff (2002) provided evidence that the hidden cost of extrinsic motivation does exist, but the undermining effects of intrinsic motivation cannot be interpreted as a contradiction to agency theory.

Motivation theorists argue that in order to improve performance, firms need to link their incentive plans to their strategic goals and targets (Salter, 1973; Rappaport, 1978; Kaplan and Norton, 2008). According to the above arguments and findings, this study can introduce the need for extrinsic[5] motivation for successful BSC implementation. As discussed above, the BSC is considered to be both a control and performance measurement tool, and in order to be implemented successfully, a BSC (i) needs to be supported by management (intrinsic[6] motivation), (ii) the authority of the BSC implementation needs to be delegated to different levels of the firm (intrinsic motivation), and (iii) firms need to link incentive plans to BSC implementation (extrinsic motivation).

2.4 Chapter summary

This chapter provides a review on two key concepts of this study, i.e. intellectual capital (IC) and balanced scorecard (BSC). The review starts with defining the main concepts of the three research topics proposed by this study in order to introduce the reader to their development stages. The IC literature discussion includes the most common definitions used, most common classifications of IC components and the most common measurement and management tools suggested. The BSC literature highlighted various definitions, the history of its development, its components and the stages of development, and its history of

[5] Extrinsic motivation: using external tools like money, accommodation or car to motivate the employee.
[6] Intrinsic motivation: internal motivation by saying thank you or management can provide different types of support (other than incentive) for task achievement.

diffusion and implementation. The main concept discussion was supported with a link to the possible theoretical perspectives that can support the link between the variables to be examined in this study. The next chapter provides detailed discussions of the research gaps, research questions proposed and hypotheses developed.

CHAPTER THREE: LITERATURE REVIEW II - RESEARCH GAP AND HYPOTHESES DEVELOPMENT

3.1 Introduction

The previous chapter discusses the main research concepts of IC and BSC. The chapter also introduced the two theories that underline this study, namely the research-based view and the agency theories. This chapter will continue discussing the main research concepts in order to identify the research gaps and link them to the research themes examined in this study. It also provides the hypotheses development.

The first theme tests the RBV, which states that a firm's resources, like IC, play an important role in a firm's value creation and CA building and enhancement (Barney, 1991, 2001). It argues that firms with more strategic resources or IC have more sustainable advantages compared to their rivals (Penrose, 1959; Barney, 1991; Peteraf, 1993; Barney and Arikan, 2001).The theme investigates the mediating effect of firms' CA on the relationship between IC and FP. The second theme examines whether IC measurement and management, via the use of BSC, mediates the relationship between IC and CA. Moreover, this research theme will also examine the mediation impact of a firm's CA on the relationship between BSC implementation and FP. The third theme focuses on examining the association between the success factors (i.e. management support to BSC implementation, linking incentives to BSC implementation and BSC implementation at different levels of firms) on both the extent and success of BSC implementation. It also studies the impact of the success of BSC implementation on firms' CA and FP. It is also proposed in the third research theme that the success factors mediate the relationship between the extent and success of BSC implementation. This research theme draws from agency theory that helps to explain the need of motivation (represented by the management support and incentive link to BSC implementation) and control (represented by BSC implementation at different level of the firm) to improve firm profitability and increase shareholders' wealth. Agency theory is also used to explain the impact of motivation and control on BSC implementation and how that can result in better FP. Overall, this study proposes that firm's value is created from its valuable IC resources and through appropriate resource management via BSC implementation in terms of the extent and success of the implementation, which are affected by success factors. The rest of this chapter discusses the literature relating to the three research themes identified and provides the hypotheses development for each of the three themes. Section 3.2 discuss the literature that links the first research theme variables in order to highlight the research gap. The research hypothesis development follows in sections 3.2.1, 3.2.2 and 3.2.3.

3.2 Impact of IC and CA on FP

RBV theory is considered as one of the most important theories in explaining the role of IC in the enhancement of a firm's CA and performance and it mainly focuses on explaining the role of the interaction and accumulation of strategic resources in building a firm's CA.

A review of the literature shows that there is a growing number of studies devoted to test the theory (e.g. Youndt et al., 2004; Tayles et al., 2007). However, most of the studies conducted around the RBV theory examined the impact of IC elements on FP (Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007), and little attention has been given to study the impact of IC as a whole on CA (Kamukama et al., 2011). Some of these studies linked elements related to human, relational or structural capital (e.g. Huselid, 1995; Huselid et al., 1997), human and structural capital (e.g. Hitt et al., 2001), human and relational capital (e.g. Collins and Clark, 2003) or linked elements from human, relational or structural capital (e.g. Fisher et al., 2010; Murray et al., 2011).

This is also supported by the argument made in Youndt et al. (2004) and Reed et al. (2006) that in order to gain the CA proposed by RBV, resources must be combined and linked together, thus in order to understand how IC becomes a source for CA and lead to enhanced performance, studying the overall IC profile is needed beyond the study of specific IC components or elements (Youndt et al., 2004). Further support is also given in Sirmon et al (2008) who argue that 'although resources are instrumental to a CA, management must effectively bundle and deploy an organization's resources for an advantage to be realized' (p.919), highlighting the importance of studying the effect of resources 'bundled' together rather than individually. Therefore, further studies are needed to examine the impact of IC as a whole on CA and FP.

Further review on the key studies shows that the work of Youndt et al. (2004) is applied to 208 firms from multiple industries. Their study took a configurational approach to investigate how human, social and organizational capital interact together to form different IC profiles. The study divided the IC into five profiles: high overall IC, low overall IC, high human capital, high social capital and high organizational capital. Their study investigates how firms' investment in human resource management, information technology and research and development differ between different IC profiles. It also investigates the impact of different IC profiles on FP. They found that high overall IC firms outperform firms with low overall IC, high human capital, high social capital and high organizational capital.

The work of Reed et al. (2006) is different than Youndt et al. (2004). Reed et al. (2006) examined the impact of IC components on firm financial performance. This study proposed that the interaction between different IC components leads to better performance. The study applied to the banking industry in the Northeast United States. This study did not investigate the overall impact of IC on firm financial performance. The study found that not all IC components interactions lead to better financial performance.

Tayles et al. (2007) investigated in which way the firms' investment in IC influence management practices, specifically performance measurement, planning and control, capital budgeting and risk management. The study also investigated whether high IC firms are better able to respond to unexpected economical changes in order to achieve high performance. Their study applied to 119 firms operating in the Malaysian market. They found that high IC firms are associated with more application of management accounting practices and better respond to different economical or market changes.

Other studies like Zhou et al. (2009) and Kamukama et al. (2011) added another variable to the relationship between IC and FP, which is the CA. They directly investigated the mediating impact of CA on the relationship between IC and FP. Kamukama et al. (2011) found CA to be a strong mediator for this relationship. However, their study investigated the mediating impact of CA on the relationship between IC and financial performance only without considering other types of firm performance, and their study applies to Uganda's microfinance firms only. The differences between operational and financial performance are considered important by Zhou et al. (2009). They consider that operational performance is the source of a firm's financial performance. Their research framework shows that operational performance is a result of a firm's CA, and the financial performance is a result of operational performance. This indicates that financial performance is not enough to reflect a firm's overall performance.

Since the above studies found a positive impact of IC on FP and the RBV theory indicates the link between IC and CA, it is important for the three variables of IC, CA and FP are linked together. However, Zhou et al. (2009) investigated the impact of IC elements and both CA and FP. Speckbacher et al. (2003) argue that intangible resources are usually combined with other tangible or intangible assets, and they do not have value on their own. They also argue that the value of the bundle of intangible resources is not consistent with the total value of individual asset values added together. Moreover, they emphasize that intangibles such as services, on-time delivery or customer loyalty cannot be separated from the respective product, as these services will add value to the product. Kaplan and Norton, as the founders of BSC, also argue that while value cannot be created by accumulating a customer database, financial goals are achieved when the target customers are satisfied (Kaplan and Norton, 2004, p.15). In spite of the importance of IC accumulation and the need to study the whole picture of IC, the minority, like Kamukama et al. (2011), investigated the impact of IC as a whole on both CA and FP. Their study investigated the mediating impact of CA on the relationship between IC and FP. The study applied to Uganda's microfinance institutions only. The study found that CA partially mediates the relationship between IC and FP.

This study builds on and extends the work of Youndt et al. (2004), who examined the impact of the IC portfolio on firms' financial performance; Reed et al. (2006), who assessed the impact of the interactions between IC components on FP; Tayles et al. (2007), who investigated the impact of different IC components on FP and Kamukama et al. (2011), who studied the mediating impact of CA on the relationship between IC and FP for the microfinance industry. This study is filling the gaps in the above studies by investigating the impact of the IC as one variable on both firm's CA and performance. In addition, this is a cross-sectional study applied to different industries and examining the mediating impact of CA on the relationship between IC and FP in order to generalize the findings. Furthermore, this study examines the Omani market, which has received little attention in IC research, albeit the increasing focus on IC-related investments in Oman both at the corporate and government levels, as well as firms' increasing awareness and use of performance measurement frameworks such as BSC. The main gap presented by this research theme is to provide generalisable empirical evidence for the mediating impact of a firm's CA on the relationship between IC and FP. The research hypothesis development related to this gap will be discussed in sections 3.2.1 and 3.2.2 below.

The research framework for this topic is presented in Figure 1.1 in the introduction chapter. This research, to the knowledge of the author, is the first of its type to be conducted in one of the Gulf countries, more specifically in Oman. Overall, this study is the first to examine IC covering all three key components, namely human capital, structural capital and relational capital, in relation to both firms' CA and performance, in a cross-sectional context within the Omani market.

In terms of the context of the study, most of the prior research that is related to IC, CA and FP examined companies in the US (Huselid et al., 1997; Collins and Clark, 2003; Youndt et al., 2004; Reed et al., 2006), Europe (Hooley et al., 2005; García-Morales et al., 2012; Santos-Vijande et al., 2012; Santos-Vijande et al., 2013; Ngo and O'Cass, 2013; Camisón and Villar-López, 2014), and Asian countries (Tayles et al., 2007; Li and Zhou, 2010; Chang, 2011; Murray et al., 2011; Kim et al., 2012; Chen and Chang, 2013; Li and Liu, 2014). In addition to that, there are other studies that conducted multinational research (Hult and Ketchen Jr, 2001; Axtle-Ortiz, 2013; Cui et al., 2014). The literature review shows that no similar research has been applied to Arab Gulf countries (i.e. Oman, UAE, Kuwait, Qatar, Saudi Arabia and Bahrain). Bontis (2002) argues that these countries are rich with oil and give great importance to human capital development and education (Oman vision 2020). He also argues that the Gulf countries outsource knowledge creation firms from developed countries, indicating that these countries still need time to strengthen their IC values.

This research will be applied to Oman as one of the Gulf countries, which also includes United Arab Emirates (UAE), Saudi Arabia, Kuwait, Qatar and Bahrain. These six countries are known as Gulf Cooperation Council (GCC). These countries' economies are classified as natural resource oil-based economies, rather than the knowledge-based economies. The World Bank classified them as high income countries (Nour, 2014). The GCC countries also have a strong strategic position in the global economy by holding 40 percent of the world's oil supplies ((Devlin, 1998). Interesting findings indicated that in 2012, the World Bank Knowledge Index showed that the average performance of GCC countries is 6.1, which is above the other Arab countries (4.21), but below North American (8.7) and European and Central Asian (7.64) countries (Nour, 2014). Based on the above findings, Nour (2014) argues that the GCC countries are transitioning faster than other Arab countries to knowledge-based economies, but they are still slower than North American and European countries. The literature shows that all the GCC countries hold similar cultures and values, and they have similar market structures (Rice, 2003). Considering Oman as one of the GCC countries, the World Bank Knowledge Index shows that Oman's performance is ranked third among the GCC countries and 47th globally (Nour, 2014). Oman is also considered the second among Arab countries in the growth of the literacy rate in the period between 1980-2000 (Bontis, 2004). Moreover, human resource development is one of the most important objectives of the Oman Vision 2020. In Oman's Vision 2020 economic conference held in Oman in June 1995, His Majesty Sultan Qaboos said the following: *'Development is not a goal in itself. Rather, it exists for building man, who is its means and producer. Therefore, development must not stop at the achievement of a diversified economy. It must go beyond that and contribute to the formation of the citizen who is capable of taking part in the process of progress and comprehensive development'* (Vision 2020 Conference, June 1995). His Majesty's statement gave top priority to human resource development and considered it as part of the nation's development. Since the development of human resources is considered as one of the most important components of IC, investigating the impact of Oman Vision 2020 on IC investment, management and development in Oman's economy is considered an important gap in the literature. Since none of the previous studies assessed the impact of the IC level on firms' CA and performance in any of the GCC countries including Oman, this study plans to fill this gap. This study will focus on Oman as one of the Gulf countries. Since the environment within which firms operate affects management's perception and attention given to IC components (Axtle-Ortiz, 2013), studies on a new market may produce results that add new contribution to the existing literature.

Due to the above reasons and since this study focuses on investigating other variables including CA, which affect the relationship between IC and FP, this study proposed to study the direction of value creation through IC investment in the Omani market. The framework linking the three variables will be extended further by adding different variables as suggested by first and second research framework presented by sections 1.2 and 1.3 in the introduction chapter. The following sections will discuss the development of all the hypotheses linked with the above research gap.

3.2.1 IC and CA

RBV theory states that firms' strategic resources, also known as intangible assets or IC, can become the main contributors to the attainability and sustainability of firms' superior performance if effectively combined and integrated (Barney, 1991; Barney and Arikan, 2001). Previous studies conceptualize the term IC as the accumulation of all knowledge, experiences and capabilities that a firm can employ to gain CA over competitors (Nahapiet and Ghoshal, 1998; Hult and Ketchen Jr, 2001; Zhou, 2009; Kim et al., 2012; Santos-Vijande et al., 2013; Li and Liu, 2014).

Due to its importance to a firm's success, CA has received much attention in different fields of business literature, including accounting, finance, economics, marketing and management (Kim et al., 2012; Santos-Vijande et al., 2013). Kim et al. (2012, p. 1612) state that *'sustainable competitive advantage is the long-term benefit of implementing some unique value-creating strategy which competitors do not implement simultaneously, along with the inability to duplicate the benefits of this strategy'.* Similarly, Li and Liu (2014, p. 2793) define CA as *'a state for organizations to cope with environmental dynamism and continuously provide satisfying products or services for customers better than competitors"*. Several studies examined the strategies that assist firms in gaining and maintaining CA (e.g. Barney, 1991; Barney, 2001; Fahy, 2000; Foss, 1997; Boyd et al., 2010; Hart and Dowell, 2011; Kim et al., 2012; Santos-Vijande et al., 2013). However, not all scholars agree on the sustainability of CA, and some of them argue that in the fast changing environment, the achievement and preservation of CA is not easy, so they suggest a sequence of short-term CA (D'Aveni et al., 2010; Li and Zhou, 2010; Chang, 2011; Murray et al., 2011).

The positive association between IC and CA is widely documented in the literature. For example, Kamukama et al. (2011) show that this relationship holds in the context of microfinance firms. Chen (2008) shows that green IC including green human capital, green relational capital and green structural capital, helps Taiwanese firms, particularly those operating in the electronic and information industries, to develop stronger CA. In a similar vein, Li and Zhou (2010) investigate the impact managerial ties and market orientation, which can be considered as IC, on firms' CA and performance in the Chinese market. They show that market orientation is positively and directly associated with differentiation and cost advantages of firms, whereas managerial ties are associated with institutional advantages that indirectly lead to differentiation and cost advantages. Chang (2011) also documents a positive association between corporate environmental ethics as an element of IC and CA. Based on the above findings, is the following is hypothesized:

H1A. High IC firms have greater CA than low IC firms.

3.2.2 CA and FP

The relationship between CA and FP is widely investigated in the IC field. This is due to the RBV theory that argues that IC is a source of CA (Barney, 2001), and research found that higher CA leads to better FP. For example, Hult and Ketchen Jr. (2001) found that CA such as the positional advantages generated from the investment in organizational learning, innovation, entrepreneurship and market orientation positively and directly affect FP of multinational corporations. Within the Chinese manufacturing industry, Zhou (2009) also found that CA such as differentiation and cost advantages generated from market orientation and managerial ties have positive impacts on FP. Murray et al. (2011) studied the impact of CA raised from marketing capabilities on FP of Chinese export venture firms, and found a positive effect. From the above discussions and findings, this study hypothesizes that the following:

H1B. Firms with high CA outperform firms with low CA.

3.2.3 IC and FP

Many empirical studies investigated the effect of different resources on performance, especially the ones classified under IC, and the outcomes expected from the investment in these resources, as theorized by RBV theory. In addition to the above discussions on the relationship between firms' CA and performance, other studies focus on examining the relationship between IC and FP (e.g. Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007) (e.g. Hult and Ketchen Jr, 2001; Li and Zhou, 2010; Murray et al., 2011). Those studies report a positive relationship between IC and FP. For example, Youndt et al. (2004) tested the relation between the IC level and a firm’s financial performance, and they found that there is an association between the firm's IC portfolio and its financial performance. Another test of this relation is conducted by Reed et al. (2006), who found that the impact of each IC component on a firm's financial performance is contingent on other components’ values. The relationship between IC and FP is also found to be positive in Tayles et al. (2007), who found that IC components, i.e. human, structural and relational capital, are associated with firms' management accounting practices changes and FP. Similarly, using a sample of 111 Spanish firms, Prieto and Revilla (2006) show that firms with high levels of knowledge and flows of learning experience superior performance.

IC is also introduced in the literature as a non-financial measure. However, the relationship between non-financial measures or IC and FP have been examined in many different situations and the results are mixed (Anderson et al., 1994; Ittner and Larcker, 1998; Banker et al., 2000). Although Ittner (1998) found negative relationship between non-financial measures and FP, others found that non-financial measures such as customer satisfaction have positive associations with returns on investment (Anderson et al., 1994; Banker et al., 2000). Based on the above findings, this study hypothesizes the following:

H1E. High-IC firms outperform low-IC firms.

3.2.4 The mediation impact of CA on the relationship between IC and FP

The above studies and findings support the RBV theory by proving that firms' strategic resources (IC) are sources of their CA (Barney, 1991; Mahoney and Pandian, 1992; Peteraf, 1993; Fahy, 2000; Barney, 2001). The different studies conducted around the above issue can be classified into three types. The first type focused on understanding how IC elements or components are linked with a firm's CA (e.g. Chen, 2008; Li and Zhou, 2010; Murray et al., 2011; Kamukama et al., 2011; Chang, 2011; Andrevski et al., 2014). These group of studies investigated the impact of different IC elements or components on a firm's CA. All the above studies found that IC has a positive impact on a firm's CA. For example, Kamukama et al. (2011) found that there is a positive relation between IC and CA in microfinance firms. Chen (2008) also studied the relationship between green IC and the firm's CA in the Taiwanese electronic and information industry. He found that the more green human IC, green structural capital and green relational capital are, the stronger the firm CA. As another investigation to the above issue, Zhou (2009) investigated how IC represented by managerial ties and market orientation affect CA and performance in the Chinese market. They found that market orientation is positively associated with differentiation and cost advantages, whereas managerial ties are associated with institutional advantages that lead to differentiation and cost advantages. The research conducted by Chang (2011) also proves the relationship between the two variables. He found that there is a positive relationship between corporate environmental ethics as an element of IC and CA.

In addition to the studies reviewed in the previous section examining the association between IC and CA, other studies linked the RBV argument directly to examine the relation between IC and FP and found a positive relationship (e.g. Youndt et al., 2004; Reed et al., 2006; Prieto and Revilla, 2006; Tayles et al., 2007). For example, Youndt et al. (2004) tested the relation between IC level and firms' financial performance and found that there is positive association between firms' IC profile and their financial performance. Another test of this relation is conducted by Reed et al. (2006), who found that the impact of each IC component on a firm's financial performance is contingent on the value of other IC components. The relationship between IC and FP is also found to be positive in Tayles et al. (2007). They found that IC components, i.e. human, structural and relational, are associated with firms' management accounting practices and performance of firms in Malaysia. Moreover, based on data collected from 111 Spanish firms, Prieto and Revilla (2006) found that firms with high levels of knowledge and flow of learning experience have more superior performance.

There are also emerging studies that argue the relationship between IC and FP is indirect, and competitive advantage is the mediator in this relationship. For example, Zhou (2009) investigated how managerial ties and market orientation affect firms' CA and performance in the Chinese market. They measured CA using differentiation and cost advantages. They found that market orientation enhances performance through differentiation and cost advantages, whereas managerial ties enhance performance through institutional advantages, which leads to differentiation and cost advantages and, consequently, better performance. This indicates that differentiation and cost advantages mediate the relationship between managerial ties and FP. Similar to Zhou, (2009), Murray et al. (2011) also found that cost and differentiation advantages partially mediate the relationship between marketing capabilities as one element of IC and FP. A more recent study, Andrevski et al. (2014), examined the impact of competitive intensity, a measure of CA, on the relationship between racial diversity as an element of IC and FP. The result of the study shows that the relationship is indirect and it is partially mediated by firms' competitive intensity.

Another study that directly investigated the mediating impact of CA on the relationship between IC and FP is Kamukama et al. (2011). They find that CA is a strong mediator for this relationship. However, their study investigates the mediating impact of CA on the relationship between IC and financial performance only, without considering other types of firms' performance, and their study applies to Uganda's microfinance firms only. The differences between operational and financial performance are considered important by Zhou et al. (2009), who consider that operational performance is the source of firm's financial performance. Their research framework shows that operational performance is a result of firm's CA and the financial performance is a result of operational performance. This indicates that financial performance is not enough to reflect a firm's overall performance. Therefore, and in order to fill the research gap of studying the comprehensive picture of IC, to investigate the impact of IC and CA on both financial and operational performance and for this finding to be generalized, this study hypothesizes the following:

H1D: IC has an indirect effect on FP via the firm's CA.

3.3 The impact of BSC implementation on the relation between IC, CA and FP

The idea of this research combines two of the most popular topics in the management accounting literature: IC and the BSC. They are combined into a single research topic in order to assess their impact on firms' CA and performance. The importance given to IC resources and the identification of their role as sources of CA has been widely discussed in the literature (Barney, 1991; Grant, 1991; Barney, 2001; Makadok, 2001). However, the issue of whether IC is the only source for sustainable CA for firms has been widely debated in the literature (Mouritsen, 1998; Johanson et al., 2001b; Johanson et al., 2001a). Therefore, many academicians and practitioners devoted their time to assessing IC's impact on firm performance (Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007). Along the same line, there are others who attempted to design, develop and propose different measurement and management techniques for these valuable resources (Edvinsson, 1997; Booth, 1998; Luthy, 1998; Dzinkowski, 2000; Bontis, 2001; Sveiby, 2001, 2010). However, most of the models developed have been criticized for their ineffectiveness in measuring and managing IC. Most of these models have not been used or tested in practice. Therefore, their benefits are not realized, and they have only been considered in theory (Sveiby, 2010). Other models like the BSC have been in practice since its first introduction, and scholars and practitioners have huge interest in applying it in their firms (Malmi, 2001; Speckbacher et al., 2003). Some studies focused on the implementation process of the BSC system (e.g. Tayler, 2010; Sainaghi et al., 2013), and others devoted effort to assessing the impact of BSC on firm performance (e.g. (Davis and Albright, 2004; De Geuser et al., 2009).

The view that IC has become a key source of CA encouraged an increasing number of firms and academicians to develop various IC measurement tools (Sullivan, 2000; Bontis, 2001; Guthrie et al., 2001; Andriesson, 2004; Gowthorpe, 2009). In the literature, IC has always been associated with non-financial measures, as many argue that most IC elements cannot be given a monetary value and are always measured in units rather than in monetary value (Edvinsson, 1997; Edvinsson and Malone, 1997; Bontis, 1998; Stewart, 1997; Sveiby, 1998; Bontis, 2001). The main link between BSC and IC is the measurement of non-financial performance. It is argued that the non-financial measures represented by learning and growth, internal processes and customer perspectives in BSC are the bases for the value creation represented by the financial perspective (e.g. Kaplan, 1993, 2004). These perspectives are linked together through cause-and-effect relationships[7] in order to create value and improve firms' competitiveness (Kaplan and Norton, 1992; Kaplan et al., 1996; Kaplan and Norton, 2001; Kaplan and Norton, 2004). The impact of non-financial measures on FP has been examined in different situations, and it has always been found to be positive (Perera et al., 1997; Ittner et al., 2003b; Abdel-Maksoud et al., 2005; Abdel-Maksoud et al., 2010). Ittner et al. (2003b) found in their study that firms combining both financial and non-financial performance measures in their BSC have higher market returns than firms with only one type of measure. Due to the importance given to non-financial over the financial performance measures, many researchers and practitioners have started to give more preference to applying measurement techniques with non-financial measures to IC measurement over those that calculate the monetary values of IC (Sveiby, 1997; Bontis, 2001; Sveiby, 2001 2010). However, Ittner (2008) has criticized the IC literature for the number of attempts made in designing different IC measurement tools without assessing the impact of the existing tools on IC management, CA and FP.

Among these measurement techniques is the BSC, which has attracted the attention of both practitioners and academicians (Hoque, 2013). In addition to being a management control device (Kaplan and Norton, 2006; Iselin et al., 2008), BSC is also considered to be an IC measurement tool (Edvinsson, 1997; Luthy, 1998; Ittner and Larcker, 1998; Kaplan and Norton, 2004; Johanson et al., 2006). The founders of BSC did not link it to IC measurement until 2004, when they realized its suitability for IC measurement and management (Kaplan and

[7] The cause-and -effect relationship indicate that there is causal relationship between the non-financial and financial performance used in BSC.

Norton, 2004). As mentioned earlier, the link between the two concepts was guided by the use of both financial and non-financial performance measures and the need to include firms' intangible assets as part of their strategic planning for better management. Kaplan and Norton (2004) argue that in order to create value, firms must align intangible assets with strategy. That shows the importance of using BSC as a measurement and management tool for effective value creation from intangible assets. To support this, Malina and Selto (2001) found that US Fortune 500 firm distributorships are using BSC to highlight areas within their business units that require improvement in order to strengthen customer relationships. Moreover, in most of the 31 BSCs implemented by different firm units, more weight was given to non-financial measures like investment in human capital, market share enhancement, customer relationship enhancement and other important elements of IC. Malmi (2001) also found that IC elements like delivery reliability and warehouse turnover have improved after implementation BSC.

Moreover, Kaplan and Norton (1996b) stated that '*the balanced scorecard enables firms to track short-term financial results while simultaneously monitoring their progress in building the capabilities and acquiring the intangible assets that generate growth for future financial performance*' (Kaplan and Norton, 1996a, p. 18). Tayles et al. (2007) found that BSC can be used for IC measurement because it considers measures related to relational capital (covered under customer perspectives) and human and structural capital (covered under growth and internal process perspectives). However, others found that firms that implemented the BSC used customized perspectives and measures to meet their needs according to their IC stocks (Malmi, 2001; Speckbacher et al., 2003; Bourne et al., 2005; Zeng and Luo, 2013). In addition to this, Ittner and Larcker (2003) found that many firms believe that they solved the problem of IC resource management by implementing BSC. In addition, some studies assessed the impact of the extent of the use of measures in the four BSC perspectives on firms' strategic planning and CA (Olson and Slater, 2002; Hoque, 2005), and they found that linking the measures from the four perspectives to firms' strategic objectives has a positive impact on firms' CA.

However, most of previous studies examined IC and BSC concepts and their impact on performance separately. Some of them focused on the assessment of IC's impact on FP (Youndt et al., 2004, Reed et al., 2006), while others focused on assessing the impact of BSC implementation on FP (Hoque and James, 2000; Banker et al., 2000; Malina and Selto, 2001; Ittner et al., 2003b; Davis and Albright, 2004; Crabtree and DeBusk, 2008; De Geuser et al., 2009). This separation may cause some misunderstandings of the link between the two concepts. For example, Speckbacher et al. (2003) investigated the implementation of BSC in German-speaking countries and found evidence that firms in German-speaking countries do not use BSC to enhance IC investment or management. Although these firms chose some related reasons for BSC implementation such as 'focusing resources on strategies', 'stronger consideration of non-financial drivers of performance' and 'improved customer focus', they neglected to choose the reason for enhancing the investment in intangibles (Speckbacher et al., 2003, p. 377). The result of this study shows that practitioners cannot see the link between BSC implementation and IC management. However, the article published by Ittner (2008) linked the two concepts of IC and IC management in order to provide a summary of how these two concepts are linked together in the literature. His study provided statistical evidence that IC measurement has an impact on FP. Most of the studies handled BSC as a performance measurement and a strategic control management tool, but none of the studies assessed its impact as an IC measurement tool. Due to importance of understanding the role of IC management in value creation and firms' competitiveness enhancement (Ittner, 2008), further studies are needed to fill this gap by assessing the impact of IC management through BSC implementation on enhancing the relationship between firms' IC and their CA and performance.

Having discussed the link between IC and BSC, the following sections of this chapter will focus on discussing the hypothesis development for all the hypotheses that propose link between IC, BSC implementation, CA and FP, i.e.H2.1A, H2.1B, H2.1C, H2.2A, H2.2B and H2.3A as presented in the second research framework in Figure 1.2.

3.3.1 IC and BSC

BSC is one of the most important tools recommended for IC measurement and management (Edvinsson, 1997; Bontis, 2001; Kaplan and Norton, 2004). The link between IC measurement and BSC implementation was provided by the inclusion of the non-financial performance measures which were directly linked to a firm's intangible values. The use of BSC supplements the management of shareholder value by defining the main growth objectives and measures for customers, the internal process for enhancing customer relationships, improving investment in people, improving investment in IT and enhancing organizational strategic alignment, which all represent a firm's IC.

Due to the importance given by both academics and practitioners to the value of IC and its role in enhancing overall firm value, many firms give more focus to IC measurement and management. The literature shows that there is an increase in BSC implementation, but this implementation was not linked to the need for IC management (Speckbacher et al., 2003, Malmi, 2001). For example, Speckbacher et al. (2003) found that the reason for BSC implementation by the German-speaking firms was not for IC management. This finding can be attributed to a firm's misunderstanding of the link between IC management and BSC implementation. However, Tayles et al. (2007) found that firms with high IC tend to implement a management technique such as BSC in order to manage IC. Based on the above findings, this study argues that firms with high levels of IC need to implement a management system such as BSC in order to be successful in IC management and to gain the CA proposed by the RBV theory. Moreover, due to the development stages that BSC experienced in order to reach the current framework (Speckbacher et al., 2003; Hoque, 2014), this study argues that as the level of IC increases, firms need to upgrade their BSC frameworks in order to reach highest extent of implementation. Based on the above arguments, this study proposes the following hypothesis:

H2.1A: Firms' level of IC is positively associated with the extent of BSC implementation.

3.3.2 BSC implementation extent and CA

The RBV theory presented in section 2.3.1 discussed the relationship between IC management and a firm's CA in theory. The discussion shows that BSC is considered one of the most commonly implemented tools for IC management (Ittner, 2008; Sveiby, 2010). So, since IC measurement is considered a source of CA (Santos-Vijande, 2013), BSC implementation is considered a source of CA (Kaplan, 2008). The communication of a firm's strategy through BSC implementation is considered an important source of CA. It has been argued that management tools and information systems which communicate a firm’s strategy effectively can be considered a source of CA (Grant, 1991; Tucker et al., 1996). Tucker et al. (1996) argue that BSC that articulates a firm’s strategies and communicates them effectively can be regarded as a source of CA. They also argue that intangible assets improve performance through a cause-and-effect relationship, and their value depends on their alignment with firm strategies. Their argument shows the importance of BSC implementation in creating value and improving firms' competitiveness.

Porter (1980) described cost leadership, differentiation and focus as the generic competitive strategies that lead toward better CA. Others argue that the success in implementing these strategies involves various resources, skills, organizational arrangements and control systems (Langfield-Smith, 1997). There are many control systems in place, with the most common one being BSC. BSC is important because of its role in linking intangible resources (IC) to value creation (i.e. building and sustaining CA). Simons (1987) suggested that management control systems need to be designed unambiguously to support the business strategy in order to lead to better CA and performance. Thus, while BSC has been regarded as a measurement system (Bontis, 2001), a strategic measurement system (Norreklit, 2000), a strategic control system (Kaplan and Norton, 1996b) and a management control system (Langfield-Smith, 1997), previous literature did not empirically test the link between BSC implementation and a firm's CA. This leads to the following hypothesis:

H2.1B: Firms that implement BSC have greater CA than those that do not.

3.3.3 The mediating effect of BSC Implementation on the relationship between IC and CA

RBV theory discussed the role of IC management as a source of CA, and many theorists supported this argument (Hansen et al., 2004; Kor and Mahoney, 2005; Lavie, 2006; Ketchen et al., 2007; Sirmon et al., 2007; Crook et al., 2008). They argue that firms need to manage their valuable resources effectively in order to gain the proposed CA. Firms can also be more competitive by implementing value-creating strategy which has not been implemented by current or potential competitors. They could also better implement strategies implemented by competitors (Bharadwaj et al., 1993). The competitors' inability to imitate the value of these strategies makes the CA sustainable (Barney, 1991). Wu et al. (2006) found that one-third of the 39 Taiwanese firms they studied are associated with high CA due to their high efficiency in IC management.

Not all the empirical studies supported the argument that there is an association between IC and CA, especially when human capital is used as an IC measure. For example, Eisenhardt and Martin (2000) and Arend and Bromiley (2009) argue that dynamic capability does not meet the criteria of heterogeneity (the dynamic capabilities are similar among different firms); therefore, it cannot be considered a source of CA. However, Wang and Ahmed (2007) show that dynamic capabilities have an indirect relationship with CA, and thus they serve as an indirect source of CA. Similarly, Ndofor et al. (2011) find that managerial actions to manage resources mediate the relationship between resource performance and CA.

The above discussion suggests that accumulating a high IC level does not directly lead to better CA. However, measuring and managing IC through better BSC implementation may result in better CA. This yields the following hypothesis:

H2.1C: The impact of IC on firms' CA is indirect via IC management through BSC implementation.

3.3.4 BSC implementation and FP

The above discussion implies that the BSC implementation may create value by helping firms manage their most valuable resources, IC. BSC also helps executives to keep a balance between short-term productivity enhancement and long-term revenue growth sustainability (Kaplan and Norton, 2001). Regardless of the misunderstanding of the link between IC and BSC implementation, the literature shows that BSC implementation was most of the time associated with performance improvement. For example, Davis and Albright (2004) in their experimental study found that bank branches that implemented BSC outperformed the branches that did not implement BSC. Another study conducted by De Geuser et al. (2009) also proved that BSC implementation leads to a firm's success and better productivity. Based on the above argument and findings, this study argues that IC management through BSC implementation is associated with better firm performance. Therefore, this study hypothesizes the following:

H2.2A: Firms that implement BSC outperform those that do not.

3.3.5 IC and FP: The mediating effect of BSC implementation and CA

Kaplan (2008) states that the idea of Kaplan and Norton's first article was based on a performance measurement research project conducted by Nolan and a Norton Institute and based on their article titled 'Measuring Performance in the Organization of the Future,' which was published in 1991. The research project assessed the performance measurement for firms whose IC are the main components of value creation. In addition to that, their interest in helping firms to measure their performance originated by an eminent British scientist called Lord Kelvin, who stated the following:

> '*I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind. So if you cannot measure it, you cannot improve it*' (Kaplan, 2008, p. 1254).

Based on the above statement, Kaplan and Norton believed that the measurement of performance or IC measurement was as essential issue for both scientists and managers. Therefore, if firms want to improve their intangible asset management, they need to link their intangible asset measurements with the management tool or system in place (Kaplan, 2008). Moreover, Sirmon et al. (2008) found that resource management is even more important than resources themselves, especially when rivals own similar bundles of resources. Kaplan and Norton (2004) viewed the firm strategy as a tool to link its tangible and intangible assets together. They insist that value does not ordinarily build inside the intangible assets, but it is created by linking these assets together in a specific way (Kaplan and Norton, 2004). Therefore, to show how value is created, the BSC strategy map is described as *'(describing) the process of transforming intangible assets into tangible customer and financial outcomes'* (Kaplan and David, 2001, p. 69). To add to the above, Andriessen (2004) reviewed the performance measurement and IC measurement literature and was able to identify some important reasons for IC measurement. These reasons include improving IC management, creating resource based strategies, translating strategy to actions and enhancing management of the entire business, which all help to lead to better performance.

Youndt et al. (2004) find evidence that firms with high IC portfolios that include a combination of human, organizational and social capital outperform firms with low IC portfolios. However, Reed et al. (2006) show that the effect of each IC component on firm financial performance is contingent on their value and the interaction with other components. Specifically, the authors show that the interaction between IC components does not always lead to better financial performance. Malina and Selto (2001) also show that IC represented by staff knowledge and skills cannot create value on its own. Instead, they find that staff with the appropriate knowledge and skills can create value through using their skills and knowledge to enhance firm productivity. This finding suggests that standalone IC elements or components or their interactions with each other do not always create value.

Based on the above arguments and the discussion of the relationship between the IC level and BSC implementation or IC management (Tayles, 2007), the relationship between BSC implementation or IC management and FP (Davis, 2004) and the relationship between the IC level and a FP (Youndt, 2004; Reed, 2006), this study can propose that the relationship between IC and FP is not direct and is mediated by IC management represented by BSC implementation.

As discussed previously in section 3.3.2, IC measurement is considered a source of CA (Santos-Vijande, 2013), and thus BSC implementation is considered a source of CA (Kaplan, 2008). Further, Kamukama, et al. (2011)

found a positive and significant association between firms' CA and performance. This finding is also supported by Zhou (2009) who found that CA such as differentiation and cost advantages generated from market orientation and managerial ties have positive impacts on FP. Moreover, BSC implementation is also found to be positively associated with FP (Davis, 2004). It is therefore proposed in this study that there is an indirect relationship between BSC implementation and FP mediated by the level of firms' CA. Thus, this study hypothesizes the following:

H2.2B: The impact of IC on FP is indirect via IC management through BSC implementation.

H2.3A: The impact of BSC implementation on FP is indirect via firms' CA

3.4 The factors affecting BSC implementation and their mediating impacts

Since the first publication of the article that introduced BSC, the tool has been widely implemented. Moreover, most of the German-speaking firms perceived it to be more beneficial to implement BSC than implementing a cost management tool, and only eight percent think the opposite. This study argues that too much control cannot work alone to improve FP. Since the BSC is considered a strategic management control tool (Kaplan et al., 1996; Simons et al., 2000; Kaplan and Norton, 2001), Kaplan and Norton (1996b) suggest that some amount of motivation, such as linking incentives to its implementation, might lead to a more successful implementation. Moreover, as is suggested by Hoque (2014), future studies can investigate the impact of motivational elements such as achievement, recognition and responsibility on the effectiveness of BSC implementation.

Although BSC implementation has been found successful in most cases (McPhail et al., 2008; Fisher et al., 2010), its role in performance improvement has been widely debated due to the lack of correlation between some non-financial measures, especially those related to human capital performance, and their impact on future FP. Others found that there are some barriers to BSC implementation, and among them are the level of support provided by management and the roles played by different management actors when the BSC is implemented (Kasurinen, 2002). Madsen and Stenheim (2014) also identified some problems associated with BSC implementation, and they classified them into conceptual, technical, social and political. Among the social problems identified are the management's commitment and different divisional managers' relations.

Due to the importance given to BSC and the diffusion of its success stories, BSC has also been implemented within government and non-profit organizations. For example, Niven (2011) shows a step-by-step process of implementing BSC in government and non-profit organizations. BSC designers argue that it is a strategic management tool that can be useful for government and non-profit organizations (Kaplan, 2001 2002). Chan (2004) found that over 40 percent of the US and Canadian municipal government organizations had sufficient understanding of the BSC concept, and those implementing the tool had a strong belief that the benefits of BSC implementation outweighs the implementation cost. However, Chan (2004) found that the lack of linking incentives to BSC implementation and a lack of management support or involvement were the major issues behind the failure of BSC implementation. An empirical study conducted by Greatbanks and Tapp (2007) suggests that the use of BSC within public organizations enables staff to appreciate their roles and to focus on performance measurement that supports their strategies. They argue that the clarity of staff's roles positively influences the achievement of their plans and helps them deliver excellent customer service. At the same time, the successful BSC implementers also found that the implementation guided the strategic direction of hospitality and hotel firms, and worked as a motivation for the given strategic direction (Sainaghi et al., 2013).

Among the factors that are shown to affect BSC implementation are the types of measures used, implementation at different business units, management support and lack of reward for achievements (Norreklit, 2000; Speckbacher et al., 2003; Chan, 2004; Hoque, 2013; Zeng and Luo, 2013). Kaplan and Norton (1996b) argue that because of the controllability nature, firms are advised to link BSC implementation to incentives, provide enough support and involvement by management, and give delegation to different unit managers, teams and individuals for successful implementation. Simon (1991) states that staff can be motivated to work hard even if they are not expecting financial incentives, and

White (1992) argues that incentives' classical role in motivating staff might be less effective than getting management involved in informing staff of their real responsibilities. He proposes that Kaplan and Norton suggested the need for motivation to reduce the effect of control in order to enhance productivity. This highlights the importance of management support, linking managers' incentives to implementation, and delegation of the authority of BSC implementation to different business units of the firm to the success of BSC implementation.

Although there is evidence of successful stories about BSC implementation and its positive impact on performance (Davis and Albright, 2004, De Geuser et al., 2009), there are also unsuccessful implementation results that include recommendations for improvement (Zeng and Luo, 2013). Previous studies have identified factors that can affect BSC's successful implementation, such as implementation at different firm levels and the proper selection of performance measures (Norreklit, 2000; Lipe and Salterio, 2000; Ittner and Larcker, 2003). The existing literature did not explore these elements, but it shows that some motivational factors are associated with BSC implementation, such as management support, linking incentives to BSC implementation and implementing BSC at different business units of the firm (Kaplan and Norton, 2008b). The BSC designers also argued that these factors are considered critical for the extent and success of BSC implementation (Kaplan and Norton, 2001, 2004, 2006). Moreover, the literature showed no attempt to assess the impact of the above factors on both the extent and success of BSC implementation. Therefore, the above review highlights a need for further research to fill this gap in the literature.

As a result of the importance given to the above factors for both the extent and the success in the implementation of BSC, most previous studies examined the impact of BSC implementation on performance (e.g. (Davis et al., 2004; De Geuser et al., 2009), and the presence of both successful and unsuccessful stories about BSC implementation. However, this study suggests that the relationship between BSC implementation and FP is not direct but through the level of success in the implementation and the suggested success factors.

3.4.1 The impact of management support on both the extent and the success of BSC implementation

Kaplan and Norton (1996) argue that firm strategy is always determined at the top level of the organization and then directed to managers and employees for implementation. They added that the implementation is effective when the firm management understands the firm's strategic direction and supports the implementation process. Several studies recognized the importance of the presence of management support and involvement in BSC implementation (Davis and Albright, 2004; Chan, 2004; Bourne et al., 2005; Atkinson, 2006; Tayler, 2010). For example, Davis and Albright (2004) find that there is a positive impact of BSC implementation on firm performance and that the management is always involved and support BSC implementation throughout all the implementation process. Moreover, Chan (2004) lists some reasons given by the participants for the failure of BSC implementation and lack of management support and commitment was among these reasons. Bourne et al. (2005) find that there are some noticeable benefits from the use of BSC, arguing that less consideration of factors such as senior staff's commitment may lead to lower extent or less successful implementation of BSC. Although previous studies suggest that management commitment is an important determinant of the success of BSC implementation (Kaplan, 2008), none of them tested this relationship empirically. Thus, the following is hypothesized:

H3.1A. Firms with more management support have a greater extent of BSC implementation.

H3.2A. Firms with more management support are more successful in their BSC implementation.

3.4.2 The impact of linking incentives to BSC implementation on the extent and the success of BSC implementation

Incentives not only encourage staff to spend more time on task achievement, but they also encourage them to exert more effort and attention to the task (Bonner et al., 2000). Sprinkle (2000) finds that staff with incentive-based contracts exert additional effort and perform better than staff with flat salary contracts. In the past, both performance measurement and management rewards were based on financial measures such as income, investment return or unit cost (Eccles, 1991). The bonuses that are completely based on profits and financial numbers faced many critiques because management encouraged the maximization of short-term profit in order to maximize bonuses at the expense of the long-run performance. To overcome this problem, many firms implemented compensation plans that include both financial and non-financial performance measures where results are difficult to be generated in the short run (Ittner et al., 2003a). One of these plans is a BSC system, which combines both financial and non-financial measures. Bourne et al. (2005) report clear link between performance measurement systems such as BSC and firms' incentive plans. They find that 67% of the participated firms claimed that they linked incentives to their measurement systems. Malmi (2001) documented that 13 out of 17 firms that participated in his study linked their BSC measures to bonus programs. Speckbacher et al. (2003) found that 70 percent of the firms that participated in their study had directly linked their reward systems to BSC measures. In addition, Banker et al. (2000) found that there was improvement in both financial and non-financial performance after linking incentives to non-financial measures of performance. However, Banker et al. (2000) did not assess the extent and success of BSC implementation, so this study suggest that the improvement in non-financial measures might be a result of other factors. This study argues that the link between firms' incentive plan and extent of BSC implementation will lead to the success in BSC implementation and consequently lead to better performance. Therefore, this study hypothesizes the following:

H3.1B. Firms with greater extent of BSC implementation are more likely to link incentives to BSC implementation.

H3.2B. Firms that link incentives to BSC implementation are more successful in BSC implementation.

3.4.3 The impact of implementing BSC at different business units of firms on the extent and success of BSC implementation

BSC was primarily intended to be used at the corporate level, but not at the business level (Kaplan and Norton, 1996b). As a result, the communication of corporate level strategy comes from headquarters of firms. However, Malmi

(2001) shows that applications of BSC is more pronounced in business units rather than at the corporate level. He found that most firms implement BSC at different business units of their organizations, and about half of the firms have a plan to implement it at the corporate level as well. Speckbacher et al. (2003) also found that only nine percent of their sample firms implemented BSC at the corporate level, while 17 percent of them implemented it at the business unit levels. Greatbanks and Tapp (2007) examined BSC implementation in public organizations. They showed that BSC is commonly implemented at the strategic planning level, team management level and at the individual staff levels, but not at the corporate level. The above findings were not surprising because CA strategies become critical at the business unit level. The business unit BSC includes specific or unique measures that cannot be found in the corporate level BSC. Many agreed with the findings that the implementation of BSC at the business unit level was always associated with unique (non-financial) measures, and at the corporate level, BSC was associated with common (financial) measures (Lipe and Salterio, 2000; Libby et al., 2004; Dilla and Steinbart, 2005; Cardinaels and van Veen-Dirks, 2010; Zeng and Luo, 2013). Kaplan et al. (1996) state that BSC reflects firms' strategic directions. They argue that each unit of firms should include both common and unique measures in their BSCs. They also recommend the use of financial measures, such as return on assets and net income, as common measures, and the use of non-financial measures, such as customer satisfaction as unique measures.

Kaplan and Norton (2006) also argue that a corporate balanced scorecard (CBSC) helps big firms develop centres to manage their strategies and connect them with corporate controls. They argue that this action should provide similar benefit to the implementation of BSC at different business units. Kraus and Lind (2010) explored the impact of CBSC implementation on the corporate control of business units. They conducted interviews with CFO-level managers in 15 of the largest Sweden firms. Their study suggests that managers believe that BSC is not important at the corporate level because management always uses financial measures to evaluate the performance of business units. The interview results show that 8 of the 15 Swedish multinational firms interviewed implemented CBSC, but the implementation had little impact on control. In a similar study, Ittner and Larcker (2003) find that in business units managers tend to have a cynical view about BSC implementation. They referred to the BSC as the “four bucket” or “smorgasbord” because management instructs them to consider the exact four BSC perspectives in implementation without considering their units’ main activity, strategies and objectives.

Simons et al. (2000) argue that management can only process a limited amount of information due to time constraints, and they have restricted attention spans. Consistent with the preceding argument, Lipe and Salterio (2000) show that management tends to simplify their roles by focusing only on financial measures imposed by corporate BSC when evaluating different units’ performance. Moreover, Malina and Selto (2001) show the effectiveness of the BSC as a tool for strategy communication and management control. However, they also found tensions among top and middle management, especially when BSC was badly designed. They found that the bad design can occur when managers impose top-down control without prior communication and participation from different units in the development of the BSC. All the above studies and their findings show the limitation of implementing BSC at the corporate level only.

On the other hand, implementing the BSC at different business units of firms is generally considered to be better than the implementing it only at the corporate level. Different studies show that there are different types of BSC, and they differ from one firm to another and between different units within the same firm (Iselin et al., 2008, Malmi, 2001, Speckbacher et al., 2003). A supporter of the BSC suggested that it should be developed and implemented in each unit in the organization, and firms should choose measures that reflect the unit's business strategy (Kaplan and Norton, 19921996b). Several studies also show that implementing BSC at the corporate level will give more weight to financial (common) measures that show the general picture of the firm rather than non-financial (unique) measures that show specific unit performance (Libby et al., 2004; Dilla and Steinbart, 2005; Cardinaels and van Veen-Dirks, 2010; Zeng and Luo, 2013) .

In contrast to the CBSC, Kaplan and Norton (2008a) show that implementing BSC at different levels of the organization has a positive impact on FP. They reported that in 2004, the Marriot Vacation Club International (MVCI)

Group implemented BSC at different levels of the organization, starting from the main units to different project teams, and ended up with 120 scorecards. They also worked with human resources units to make sure that the objectives of the staff were linked to the main group's strategic objectives. The CEO of the group reported '*measurable improvement in all areas of the business*', which resulted in a 20 percent improvement in operating profit, from $149.3 million in 2003 to $306 million in 2007 (Kaplan and Norton, 2008a). However, the study did not investigate the impact of BSC implementation at different business units of firms on the extent of BSC implementation.

Other studies found that the performance measures categorized according to BSC framework perspectives and cover all units' performance have the potential to improve managers' awareness and ability to judge the effectiveness of firm strategies and revise firms' strategies accordingly (Tayler, 2010; Cheng and Humphreys, 2012). Bourne et al. (2005) also found that corporate level BSC provides a degree of focus, but it doesn't have impact on performance. They argue that the real improvement in performance is produced when BSC implementation spreads, and it is used as a device to discuss performance of all staff members, including front line staff and operators (Bourne et al., 2005). Jensen (2010) also argued that implementing BSC at the corporate level can never create value due to management's prioritization of easy actions over the important ones. This indicates that the measures used in business unit BSCs may have more impact on a firm's success, which shows the importance of implementing BSC at different business units of organizations, and thus the following is hypothesized:

H3.1C. Firms that implement BSC at different business units of firms have a greater extent of BSC implementation.

H3.1C. Firms that implement BSC at different business units of the firm are more successful in BSC implementation.

3.4.4 The mediation impact of the success factors on the relationship between the extent and success of BSC implementation

Several studies show that factors such as management support and linking incentives to BSC implementation, as well as BSC implementation at different business units of firms have positive impacts on FP (Banker et al., 1996; Banker et al., 2000; Malmi, 2001; Chan, 2004; Bourne et al., 2005; Jensen, 2010; Tayler, 2010; Cheng and Humphreys, 2012). Others also find that firms that implemented the BSC system exhibit higher productivity and better performance than those that did not adopt the system most of the time (Hoque and James, 2000; Banker et al., 2000; Malina and Selto, 2001; Ittner et al., 2003b; Davis and Albright, 2004; Crabtree and DeBusk, 2008; De Geuser et al., 2009). Since the BSC is considered a strategic management control tool, many have questioned the controllability feature and its impact on staff productivity and FP (Otley, 1999; Norreklit, 2000; Otley, 2003). Otley (2003) argues that a performance measurement and control mechanism such as BSC is considered the most powerful tool used to influence staff behaviour towards productivity. The literature shows that many firms stopped their BSC projects due to the implementation time and cost barriers (Malmi, 2001; Speckbacher et al., 2003). Therefore, due to the controllability feature of BSC, the founders suggested that some motivation is needed to enhance BSC implementation and make it successful. BSC founders argue that BSC implementation is time consuming and staff need to be motivated to exert additional effort in achieving the proposed targets (Kaplan et al., 1996).

Whilst previous studies have argued that the extent and success of BSC implementation is affected by the three motivational factors, this study proposes that the relationship between the extent and the success of BSC implementation is mediated by the three success factors. The following hypotheses are therefore proposed:

H3.3A. The relationship between the extent and success of BSC implementation is indirect through management support.

H3.3B.The relationship between the extent and success of BSC implementation is indirect through linkage of incentives to BSC implementation.

H3.3C.The relationship between the extent and success of BSC implementation is indirect through BSC implementation at different business units of firms.

3.4.5 The relationship between the extent of BSC implementation, success of BSC implementation, CA and FP

It has been widely suggested that the success of BSC implementation leads to better productivity and performance (Kaplan and Norton, 1996b; Kaplan, 2002, Olson and Slater, 2002; Libby et al., 2004; Kaplan and Norton, 2006; Iselin et al., 2008; Ansari, 2010; Tayler, 2010; Niven, 2011; Kaplan et al., 2012; Zeng and Luo, 2013). Therefore, many focused only on the process of implementation in different contexts to show firms the different ways of implementing BSC in order to reduce failures and enhance implementation success (Fernandes et al., 2006; Bhagwat and Sharma, 2007; Tayler, 2010; Chen et al., 2011; Amado et al., 2012; Sainaghi et al., 2013). However, other studies criticized the BSC model and its implementation process and argued that the limitations associated with BSC and its implementation may adversely affect a firm's productivity (Ittner and Larcker, 2003; Norreklit, 2000; Lipe and Salterio, 2000; Neely, 2005; Neely, 2008). Hoque and James (2000) tested the association between firm size, product life cycle, market position, BSC implementation and FP. They found that BSC implementation is positively associated with FP, but this association does not depend on firm size, product life cycle, nor firms' market position. They proposed that this relation might depend on other factors such as the success in BSC implementation. Kaplan and Norton (2013) suggested that in order for firms to succeed in BSC implementation, they need to consider different factors affecting the implementation, which are identified at different development stages of the model. They argue that if firms consider all the factors and act fast to overcome their effects, they will gain the proposed advantages. Therefore, and since not all firms were successful in BSC implementation (Ittner and Larcker, 2003, Zeng and Luo, 2013), this study investigates whether the extent and success of BSC implementation result in greater CA and better FP.

Based on the above discussions on the impact of BSC implementation on the success of BSC implementation, the impact of the extent of BSC implementation on firms' CA (discussed in section 3.3), the effect of success in BSC implementation on firms' CA and performance, and the impact of firms' CA on performance (discussed in section 3.2), this study argues that the success in BSC implementation is a mediator for the relationship between the extent of BSC implementation and firms' CA, and firms' CA mediates the relationship between the success in BSC implementation and FP. Therefore, this study hypothesizes the following:

H3.4A. Firms with greater extent of BSC implementation are more successful in BSC implementation than those with a lesser extent of BSC implementation.

H3.4B. Firms that are more successful in BSC implementation have greater CA.

H3.4C.The effect of the extent of BSC implementation on firms' CA is indirect through the success in BSC implementation.

H3.4D.The effect of the extent of BSC implementation on FP is indirect through the success in BSC implementation.

H3.5A. Firms with greater success in BSC implementation outperform those with lesser success.

H3.5B.The effect of the success in BSC implementation on FP is indirect through CA.

3.5 Chapter summary

According to the three research frameworks suggested, the relationship among IC, BSC implementation, a firm's CA and performance can be explained by both RBV and agency theories. This link is proposed due to IC and BSC contributions to both a firm's CA (suggested by the RBV theory) and overall shareholder wealth (suggested by the agency theory). Then the discussion highlighted the path that led to the identification of the research gaps and research questions, and it explained how this research can contribute to the existing literature of both concepts. The main contribution of this thesis is to explain the relationship between the two concepts and show how this relationship can enhance both a firm's CA and performance, as illustrated by the main research framework presented by Figure 1 in the introduction chapter. The next section of this report discusses the research hypotheses development, research methods, research instrument, and data analysis methods.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

The previous chapters discussed the literature review around the IC and BSC implementation as the main research concepts. The chapters start with defining the two concepts, discussing the history and the development of the concepts, and then evaluating the main research issues around them for identifying the research gaps. The main research gaps identified between the two concepts is a new framework that link the two concepts with firm CA and performance. The chapters also link the research gaps that link IC, BSC implementation, CA and FP to resource-based view and agency theory and describe the research questions and the hypotheses development.

The aim of this chapter is to discuss the research design applied in this study. Based on the research objectives, questions and hypotheses discussed and listed in both introduction and literature review chapters, the research methods and research instrument design will be explained and the justification for selecting these will be stated. This will be followed by the justification for the sampling and data collection procedures. Finally, the data analysis method will be explained.

4.2 Overview of research methodology and research methods

The research methodology or research design is *'the overarching plan for the collection, measurement, and analysis of data. It also describes the purpose of the study and the kind of questions being addressed, the techniques to be used for collecting data, approaches to selecting samples and how the data are going to be analysed*' (Gray, 2013, p. 128). Ryan et al. (2002) described the methodology as the overall process of doing research, including both ontological and epistemological dimensions. In line with their thoughts, Neuman and Kreuger (2003) argue that research methodology contains different ways to understand social reality and to measure, to observe and represent different ways of looking at the whole world. They identified three main approaches to study social phenomena, namely positivistic, interpretive and critical approaches. They also described eight differences between the three approaches. These differences are summarized in Table 4.1.

Table 4.1: Approaches to study social phenomena			
The differences	**Positivistic Approach**	**Interpretive Approach**	**Critical Approach**
Why should one conduct social scientific research?	Positivist conduct research is done to discover and document universal laws of human behaviour, to understand how the world works, and to control and predict events.	This approach seeks to develop an understanding of social life and to discover how people construct meaning in natural settings.	This approach seeks to change the world and to critique and transform social relations.
What is the fundamental nature of social reality (ontology)?	Their ontological assumptions rely on the fact that social reality is real and exists somewhere and it is waiting to be discovered. It is not random, so it has stable order and additive patterns.	With the interpretive approach, social reality is not waiting to be discovered, it is not “out there”. Rather, the social world is what people perceive it to be and it exists as people experience it and give it meaning. It is based on people’s definitions.	This approach assumes that social reality is “out there” and waiting to be discovered. It gains its constant shape according to social, political, cultural and other factors. It is full of illusion, myth, and distortion.
What is the basic nature of human beings?	This approach assume that people are self-interested, pleasure-seeking and rational individuals	This approach considers people as flexible in creating meaning from social interaction, and they use such meanings to interpret their social world and make sense of their lives.	The critical approach sees people as creative, changeable, adaptive, and having a great deal of unrealized potential.

Note: This table adapted from Neuman and Kreuger (2003

Continue table 4.1: Approaches to study social phenomena			
The differences	**Positivistic Approach**	**Interpretive Approach**	**Critical Approach**
What is the relationship between science and common sense?	This approach makes a clear separation between them and considers common sense as lower to science.	The interpretive approach views common sense as an alternative way to interpret the world and is neither better nor lower than science.	With this approach, common sense is based on false consciousness and the objective reality lies behind myth and illusion.
What constitutes an explanation or theory of social reality?	It follows a *nomothetic* approach. Researcher assume that laws operate according to strict, logical reasoning and use deductive logic.	This approach emphasizes the *ideographic* (provides a symbolic representation) and uses inductive logic. It argues that theory describes and interprets how people live their lives.	With this approach, the explanation or theory of social reality is partially deterministic and partially voluntary.
How does one determine whether an explanation is true or false?	This approach emphasizes the importance of avoidance of logical contradiction, consistency between explanation and observed facts, and replicability.	With this approach, an explanation is true if it makes sense to those being studied and if it allows others to understand deeply or enter the reality of those being studied. It argues that an explanation is accurate if the researcher conveys a deep understanding of the way others reason, feel, and see things.	This approach emphasizes the ability of theory to understand and change the world. It uses praxis to separate good from bad theory, that is, explanations are considered when they help people understand the world and change it.

Note: This table adapted from Neuman and Kreuger (2003

Continue table 4.1: Approaches to study social phenomena			
The differences	**Positivistic Approach**	**Interpretive Approach**	**Critical Approach**
What does good evidence or factual information look like?	This approach argues it should be observable, precise, and independent. Its observable facts are distinct from values, ideas, or theories. Its subjective understanding of the empirical world is shared, and factual knowledge is not just based on one person's observations and reasoning.	This approach argues that evidence cannot be isolated from the context and facts are fluid and embedded within a meaningful system. Evidence is not impartial, objective and neutral.	For this approach, the facts of material conditions exist independent of subjective perceptions, but these facts are not theory-neutral. They try to bridge the object-subject gap.
Where do socio-political values enter into science?	This approach argues that science should be **v**alue-free and objective.	This approach recognizes that science is not value-free and researchers should reflect, re-examine, and analyze personal points of view and feelings as a part of the process of studying others.	In this approach, what's important is that a researcher commits to a value position and has an activist orientation.

Note: This table adapted from Neuman and Kreuger (2003)

Most of the earlier accounting research was categorized under the positivist approach due to their quantitative approaches. Examples of the quantitative research within IC area research is the one conducted by Youndt et al. (2004) and Reed et al. (2006) and from BSC area is the one conducted by Hoque and James (2000) and Malmi (2001). However, now-days many saw the need to investigate the recent accounting issues by mixing quantitative and qualitative approaches. As an example is the research conducted by Tayles et al. (2007) and Sholihin and Pike (2009) in the area of IC.

Accounting research has been classified into three groups: (i) mainstream, (ii) interpretive, and (iii) critical accounting research (Burrell and Morgan, 1979; Hopper and Powell, 1985; Chua, 1986; Ryan et al., 2002).

The mainstream approach is equivalent to the positivist approach. It takes an objective view of the society, regards individual behaviour as deterministic, and uses empirical observation and a positive research methodology. Interpretive research concerns understanding the social world and making sense of the social characteristics of daily life. Critical accounting research views the society as being shaped by social structure and seeks to remove the dominant ideological practice (capitalism). Based on the work of Chua (1986), Ryan et al. (2002) summarized a comparison of the three research approaches concerning beliefs about knowledge (epistemology and methodology), beliefs about physical and social reality (ontology, human intention, and rationality) and the relationship between accounting theory and practice as shown in table 4.1 above, which are discussed below.

With regards to their beliefs about knowledge, mainstream researchers believe that theory and observation are independent. They use quantitative methods for data collection as a tool for providing generalizable evidence. In interpretive research, theory is considered as a basis for explaining human intentions. The theory adequacy is checked via logical consistency, subjective interpretation, and by agreeing with the actor's common-sense explanation. However, with the critical approach, the researcher believes that the criteria used for theory judgment are always temporal and restricted by context. One of the beliefs in this approach is that the researcher can only understand social objects through studying their development history within combined relationships.

Concerning the beliefs about physical and social reality, the mainstream researcher views empirical reality as objective and external to both the subject and researcher. This researcher believes that individuals are passive objects who are rational when pursuing their targeted goals. In a mainstream researcher’s view point, society and organizations are fundamentally stable, and their dysfunctional behaviour can be managed by applying control systems. In the interpretive approach, the researcher views reality as socially created and can be objectified via human interaction. This researcher also views human action as intentional and has meaning grounded in its social and historical contexts. In this approach, the researcher assumes that social order and conflict intervened through shared meaning. The critical approach takes another viewpoint by believing that empirical reality can be identified by its objective and real relations;

however, it is altered and reproduced via subjective interpretation. This approach also accepts human intention and rationality, but it is argued that these factors have to be analyzed critically.

Finally, the three approaches differ in defining the relationship between accounting theory and practice. The mainstream researcher believes that accounting is concerned with means, but not ends (value-neutral), and he or she argues that existing institutional structures are taken for granted. The interpretive approach looks at the accounting theory as a means for action explanation and as a tool to understand how social orders are produced and reproduced. However, the critical researcher believes that theory has a critical importance in the identification and elimination of dominant ideological practices.

According to above comparisons made between the three major approaches in research methodology, and based on the research questions and hypotheses designed in this study, it is clear that this research follows the positivistic (mainstream) approach due to the following reasons. First, the main focus of this research is to study the patterns of firms' and individuals' attitudes and behaviours in investing and managing IC. Compared to the interpretive and critical approaches, this study is not intended to understand and explain the meaning of firms' or individuals' attitudes and behaviours, like the interpretive approach; nor does it plan to change their attitudes and behaviours, like the critical approach. Second, this study is guided by the proposed research hypotheses, which are designed to be based on previous literature, and they will be tested with empirical data collected through the questionnaire survey and further supported using the interview findings. Finally, the data collected from the questionnaire survey will be mainly in the quantitative form and the quantitative data analysis method will be used.

There are two main standard research methods that can be applied to business research, which are quantitative and qualitative. There had been criticisms on distinguishing the two research methods. For example, according to Layder (1998), the distinction between these research methods is false or not useful, and Onwuegbuzie and Leech (2005) argue that the distinction between the two methods is divisive and distracts the advancement of both social and behavioural sciences. In spite of these criticisms, many scholars like Bryman and

Bell (2011) and Bernard and Bernard (2013) argue for the distinction between quantitative and qualitative research methods. They argue that such distinction provides guidance for researchers to select the right research method. The main difference between the two research methods, described by Bryman and Bell (2011), is that the quantitative method emphasizes on quantification during data collection and analysis, while the qualitative method emphasizes on words rather than quantification in the data collection and analysis. Another distinction is provided by Thomas (2003), who argues that the qualitative method involves a researcher discussing the characteristics of people or events without using measures or amounts, while the quantitative method focuses attention on using measures to discuss any variable in use.

Each of the two methods has advantages and disadvantages. In regards to the qualitative method using interview advantages, the data collected is extended and detailed. It is also known for generating informed and well-illustrated account of the subject matter, giving valid and reliable data (Bryman and Bell, 2011, Saunders, 2011). In spite of its advantages, it also has disadvantages such as; the method considered more complicated, takes long time or slower, more expensive, more intuitive, difficult to compare and measure and it is limited in answers (Bryman and Bell, 2011, Saunders, 2011). While others consider the qualitative data as limited, unreliable and lacking solidity (Walliman, 2005). When it is compared to the quantitative approach, the quantitative approach provide standardize evidence that is measurable and comparable (Smith, 2017). The quantitative research also considered more accurate and precise because the researcher is independent of what is being researched. This approach is known to be cheap, straightforward, quicker and easy to generalize. In the quantitative approach the researcher collects data from different units which make the data collected statistically viable. However, in the disadvantages side Easterby-Smith et al. (2012) argue that quantitative data requires a high level of interpretation skills, greater probability of bias, less or no details on explanation and it is mainly dependent on statistically accurate data.

An alternative approach to the quantitative and qualitative approach is the mixed method. The mixed method combines both quantitative and qualitative approaches. There are three types of mixed methods described by Creswell et al. (2003): sequential, concurrent and the transformative mixed method. In the sequential approach, the researcher elaborates on the findings of one of the methods using another method. For example, in this approach the researcher starts with the quantitative method and then according to the findings the qualitative method followed to provide support to the first method's findings. The concurrent approach is similar to the sequential; however, the researcher collects the data for both quantitative and qualitative methods at the same time. Then the information from both methods are integrated together and interpreted to provide comprehensive analysis to the research issue. The last but not least is the transformative approach. In this approach the researcher uses a theoretical lens for a research design that contains both quantitative and qualitative data. The theoretical lens provides a framework for each research topic, collecting data methods, and discus the outcomes of the research or suggest any anticipated changes.

A group of researchers (Collins et al., 2006 ;Bryman and Bell, 2011) provided rationales for using mixed methods in research. They suggest that researchers are using mixed methods for the following reasons: (i) improving the accuracy of the data collected, (ii) producing a comprehensive picture by combining information complementary types of data or sources, (iii) avoiding the bias in using single-method approach and for developing data analysis and building upon the research initial finding by using distinct types of methods or data.

Taking into account the differences between the quantitative and the qualitative research methods in research, their advantages and disadvantages and the advantages of using the mixed method approach to research, this study is applying the mixed method approach. Considering the three types of mixed method approaches, this study uses the sequential mixed method where the quantitative data using a questionnaire is collected first and then according to the general findings, the qualitative data using an interview is followed in order to support the findings of the questionnaire.

Additionally, this research also follows the quantitative research steps suggested by Bryman and Bell (2011). These researchers described the steps as the following: identify the theories supported by the identified research gap; set the hypothesis according to the gap and the theory, to design the research framework; decide on measures for the selected variables; select the research context; select research subjects/participants; collecting data/administer the research instrument in order to collect the required data; analyse the data collected; and generate findings and develop a conclusion based on the findings.

This study selected a questionnaire survey for two reasons. First, the research requires quantification of key variables, for which secondary data is not available (Hoque and James, 2000; Youndt et al., 2004). Second, a questionnaire survey is a commonly used research method in the literature for issues relating to IC measurement and management, BSC, CA and their association with FP (Tayles et al., 2007; De Geuser et al., 2009). Due to the need of this study to measure the level of IC, BSC implementation level, the success in BSC implementation, the extent of implementing BSC, the success factors, firm competitive advantage and firm performance, this study uses primarily the quantitative approach represented by the questionnaire survey. An interview survey is only conducted to support the findings from the questionnaire survey. This helps to overcome the drawbacks listed above from the questionnaire survey.

4.3 Data collection

Due to this research requirement and limitations, this study uses primary data collected using a questionnaire survey and semi-structured interviews. The data collected is used to measure IC, CA, BSC implementation level, the extent of implementing BSC, BSC success factors (management support to BSC implementation, incentive link to BSC implementation and BSC implementation at different levels of the firm), the success of BSC implementation and FP. The questionnaire design and the interview guide will be discussed in sections 4.3.1 and 4.3.3 respectively.

After the questionnaire was initially designed based on prior literature on IC, BSC, CA and their association with FP (e.g. representative references), it was sent out by e-mail to 30 managers of the intended participants as a pilot study to get their feedback on the questionnaire's design. Ten copies of the questionnaire were returned with feedback. The respondents of the pilot study recommended only some changes to the wording of questions and some recommend an Arabic translation. No major changes that can affect the outcome were suggested. After revising the questionnaire based on the comments received from the pilot test and translating it to Arabic, the questionnaire was sent again for a second round of pilot test. In the second pilot test, 30 questionnaires were distributed, including those 10 that responded to the first stage of pilot test. This second pilot test resulted in 9 returned questionnaires without any further recommended changes. Therefore, the questionnaire is only finalized after the second phase of pilot study. The main questionnaire was sent directly to the participants by e-mail and they were asked to return it back within three weeks. Follow-up e-mails and reminders were sent after three weeks.

4.3.1 Questionnaire design

As mentioned above, this study applies the quantitative research approach through the use of a questionnaire survey (see appendix A.1 for questionnaire cover letter, contents and appendix). The design of the questionnaire is mainly intended to measure firms' level of IC, BSC implementation, the three success factors for BSC implementation, the success in BSC implementation, CA, and FP. Detailed discussions on the design of the measurement of each variable are provided in section 4.3.2. The questions used to measure the eight variables are based on a 7-point Likert scale, asking the participants' for their views on the various aspects of the key variables of interest. The Likert scale that can be used to measure organizational attitudes ranges from 2 to 19 (Shaw and Wright, 1967). Most of the previous studies that measured the above research variables used either a 5-point (e.g. Youndt et al., 2004) or a 7-point (e.g. Tayles et al., 2007) Likert scale. Most of these studies targeted senior management of the organizations under study. Others argue that the use of a 5-point Likert scale or less restricts participants' opinions that they will be forced to choose from the limited available options. When the number of options increase, the result will be more precise and accurate (Matell and Jacoby, 1972). They also argue that the participant may find that he/she does not have sufficient positive or negative attitudes toward an answer to a question to select the lowest positive or negative opinion on a continuum scale. While other advice not to extended it further by providing confusing scales that make it difficult to select from (Shaw and Wright, 1967). However, if a finer scale with logical options was provided, that will allow the participant to express his/her opinion more precisely, and the utilization of zero or undecided points will automatically decrease. Moreover, Lissitz and

Green (1975) argue that the increase in the number of scale points is always associated with an increase in the reliability of the results. Therefore, bearing in mind of the time constraint of the participants, and yet still providing the finer scales needed to allow them to express their opinions more faithfully, a 7-point Likert scale was used to measure the key variables in this study.

4.3.2 Research variables

The key research variables that are measured using the questionnaire survey are IC level, BSC implementation extent, BSC success, BSC implementation at different levels of the firm, the management support to BSC implementation, incentives link to BSC implementation, CA and FP. The design selection for these research variables is discussed thoroughly in the following sections.

4.3.2.1 Measures for IC variables

To measure the level of IC of firms, many previous studies used questionnaires (Youndt et al., 2004; Reed et al., 2006, Tayles et al., 2007), due to the lack of secondary data. These studies used either content analysis or questionnaire surveys to measure IC and IC components. Most of the studies that used content analysis were investigating IC reporting and not measuring IC value, while using a questionnaire survey for IC measurement. This study uses a number of questions in the questionnaire to measure the level of IC according to respondents' views. To measure the level of IC, this study adapts some of the items used in Youndt et al. (2004), Reed et al. (2006) and Tayles et al. (2007). However, Youndt et al. (2004) and Reed et al. (2006) follow the management classification of IC components, which doesn't make all the measures used by them directly relevant to this study, so they were adapted to fit this study requirement . Moreover, some of the measures used by Reed et al. (2006) are related specifically to the banking industry, and they do not directly apply to the other industries covered in this study. In addition to the above, Tayles et al. (2007) failed to include some important IC measures which are widely used by Youndt et al. (2004), Reed et al. (2006). Therefore, this study adapted the items discussed in table 4.2 to suit the different industries, the Omani market and the nature of this research. The participants' ratings on the IC items included in the questionnaire are used to measure the level of human, structural and relational capital of their respective firm. The combined value of the three variables will be used to measure the level of IC. Table 4.2 below provides explanations for the selection of the IC measures used.

Table 4.2 : Design of IC measures	
The IC Measures Used	**Explanation on the choice of IC measures used**
Human Capital Measures:	
HC1. Our employees are highly skilled	The measures from HC1 to HC6 are adapted mainly from Youndt et al. (2004), Reed et al. (2006) and Tayles et al. (2007). HC1 represents all employees' skills. HC2 represents employee's job experience. HC3 represents employees' innovative capabilities. Youndt et al. (2004) and Reed et al. (2006) used the item *Employees Develops New Ideas and Knowledge* to represent employees innovativeness, whilst Tayles et al. (2007) used *Managers and Employees are Innovative*. HC3 combines the views of all three studies. Whilst Reed et al. (2006) focused on employees' ability to focus the quality of service, Tayles et al. (2007) considered quality in general. HC4 in this study is more in line with the latter in that it related the measure to service and/or product quality.
HC2. Our employees are experts at their jobs	
HC3. Our employees are innovative in generating new ideas	
HC4. Our employees are able to focus on the quality of service/product	

Continue table 4.2 : Design of IC measures	
The IC Measures Used	**Explanation on the choice of IC measures used**
Continue Human Capital Measures:	
HC5. Our employees share knowledge	HC5 is adapted from Tayles et al. (2007), but it is altered from “employees is required to share knowledge” to “employees share knowledge”. The measure is revised because the requirement to share knowledge represents more on firms’ policy on knowledge sharing, which can be considered as part of the structural capital rather than human capital. HC6 is adapted from Tayles et al. (2007), but it is revised to include all employees. This item is used to measure employees’ commitment to work. Some of the measures used by the three studies were excluded due to the following reasons: - Some of them are combined with measures like brightness and creativity, which are considered skills. - Questions 6-11 used in Reed et al. (2006) are industry-specific and almost not directly relevant to the Omani market. - The item on “our employees are considered the best in our industry” is a problematic measure in that different firm and different respondents from the same firm may have different views on who their competitors are (i.e. have different reference point) and thus rate their employees against the industry differently.

Continue table 4.2 : Design of IC measures	
The IC Measures Used	**Explanation on the choice of IC measures used**
Continue Human Capital Measures:	
HC7. Our employees are loyal to the firm	The measures from HC7 to HC12 are selected from the human capital items included in studies such as (Vivien and Jane, 2007, Striukova et al., 2008). These items are selected given their important roles in value creation and their relation to the Omani environment.
HC8. Our employees are highly educated	
HC9. Our employees are highly motivated.	
HC10. Our employees are capable of managing work time	
HC11. Our employees are capable of utilizing resources effectively	
HC12. Our employees are highly productive	
Relational Capital Measures:	
RC1. Our customers are satisfied	Although this study used the question design by (Youndt et al., 2004, Reed et al., 2006), it did not use the measures for relational capital because both studies considered the employees' social relation with customers. This study examines IC from the accounting perspective, so it is intended to use relational capital measures used by accounting studies (e.g. (Tayles et al., 2007, Vivien and Jane, 2007, Striukova et al., 2008). The questions from RC1 to RC7 are all adapted from (Tayles et al., 2007), but they are slightly altered to suit the Omani environment. Moreover, measures 8 and 9 are excluded because they all represent the relationship with suppliers.
RC2. Our customers are loyal	
RC3. Our customer complaints are always considered in product/service development	
RC4. Our target is to have continuous business with our customers.	
RC5. There are clear market segments and customer profiles in place	
RC6. We have a good relationship with customers	
RC7. We have a good relationship with suppliers	

Continue table 4.2 : Design of IC measures	
The IC Measures Used	**Explanation on the choice of IC measures used**
Continue Relational Capital Measures:	
RC8. We have a good relationship with investors	The measures RC8 to RC12 are all selected from IC measures used by previous accounting studies like (Vivien and Jane, 2007, Striukova et al., 2008). These measures are selected due to their continuous use by previous studies. Moreover, the two studies found that these measures are frequently disclosed by big firms.
RC9. We have a good relationship with creditors	
RC10. Our brands are well known	
RC11. Our firm has a good reputation	
RC12. Our market share is high compared to our competitors.	
Structural Capital (SC) Measures:	
SC1. Our brands, patents, trademarks and licenses represent our firm's knowledge	The measures used to measure SC followed the style used by (Youndt et al., 2004, Reed et al., 2006). The measures SC1, SC3, SC4, SC6 and SC7 are adapted from (Youndt et al., 2004, Reed et al., 2006, Tayles et al., 2007). However, some measures are excluded as they measure investment in structural capital, not the level of intellectual capital. The measures SC2, SC5, SC8, SC9, and SC10 are suggested as SC measures by (Vivien and Jane, 2007, Striukova et al., 2008) as they were highly disclosed by big firms.
SC2. Our brands, patents, trademarks, copyrights and licenses are legally protected	
SC3. There are manuals in place to describe routine activities	
SC4. There are databases in place to manage firm's activities	
SC5. There is a job description in place for all types of jobs	
SC6. Innovation in all firm aspects is given high importance	
SC7. Our firm's culture represents our ways of doing business	
SC8. Our firm has a protection system against knowledge loss	
SC9. Our firm's organizational structure represents different responsibilities and communication levels	
SC10. There is a quality system in place	
SC11. There is a time utilization monitoring system in place	Moreover, the measures SC11 and SC12 are suggested by (Edvinsson and Malone, 1997) as SC measures. These measures have not been used by previous studies to measure SC. However, this study is using them due to their importance in value creation found by (Kannan and Tan, 2005, Chen, 1997).
SC12. There is a resource utilization monitoring system in place.	

4.3.2.3 Measures for firm performance variables

Previous studies that examined the impact of IC and BSC implementation on FP used either secondary data (e.g. Youndt et al., 2004; Davis and Albright, 2004) or primary data collected from questionnaire surveys (e.g. Tayles et al., 2007) for measuring FP. This study uses primary data collected by questionnaires for the following reasons. This study applied to large firms operating in the Omani market which include both listed and non-listed firms. The listed firms in the market are 117 firms with 13 of them in the investment industry working with few employees. The majority of the listed firms are found to have less focus on IC as well as BSC implementation, and this is due to the small number of employees in those firms. However, the non-listed firms are found to have more focus on IC investment and give more priority to BSC implementation compared to listed firms. The reason for that is the large number of employees in non-listed firms. Since, the intention of this study is to investigate the relationship between IC, BSC and FP, combining both listed and non-listed firms is considered important. However, when it comes to financial information, the private sector firms in the Omani market consider the firm financial information as top secret and it is rarely released to the public, except the financial report of the listed firms. Therefore, and due to (i) the inclusion of both listed and non-listed firms and (ii) the difficulties in accessing the financial reports of the non-listed firms operating in the Omani market, this study uses primary data collected through questionnaire to measure FP for the main analysis.

The main study measures FP by asking the management about their perceptions of their FP in the respective areas. There are in total 10 FP measures (FP1-10) used in this study, which were adapted from previous studies that examined the impact of IC and BSC on FP (e.g. Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007; Hoque and James, 2000; Ittner et al., 2003b).

This study uses most of the measures used by the two types of studies, and it excluded the measures not used by the studies related to BSC implementation. The stock market influence measures used by Tayles et al. (2007) and the Tobin's q measure used by Youndt et al. (2004) are excluded. This is because the stock market influence measures do not apply to the non-listed firms and the Tobin's q measure is unknown within the Omani market. This study also excluded some operational measures like future outlook, which might be interpreted differently in the Omani market.

To conduct the robustness test, this study also uses secondary data from the financial reports to calculate three key performance measures, namely return on assets (ROA)[8], return on equity (ROE)[9] and total shareholders return (TSR)[10], for the listed firms, to replace the performance measures collected from the questionnaire survey. The firm's financial reports for the year 2016 are used for calculating the three performance measures. The financial reports are downloaded from the Muscat Security Market website[11].

4.3.2.4 Extent of BSC implementation

Previous studies primarily used either experiment or questionnaire survey to measure the BSC implementation (e.g. Davis and Albright, 2004; De Geuser et al., 2009). The BSC implementation or usage was measured using financial (Davis and Albright, 2004) or a mix of financial and non-financial measures (Hoque and James, 2000). Performance measures used in the BSC vary from one firm to another and performance measures do not always represent BSC implementation. Thus, it is difficult to measure BSC implementation using only performance measures. Homburg et al. (2012) found that comprehensiveness is important in BSC implementation. He argues that the use performance measurement is not enough to measure comprehensiveness in BSC implementation. This study is measuring the extent of BSC implementation and not only the usage. Many argue that the extent of meeting the BSC implementation criteria such as the inclusion of both financial and non-financial performance measures, there are cause-and-effect relationships between performance measures, linking performance measures to the firm plans, set target for every performance measure and link incentives to implementation is also important (Kaplan, 2008, Hoque, 2014). Moreover, Ittner et al., 2003b went beyond performance measures by including the link to strategic plan, setting targets for performance measures and linking target achievement with incentives. This study is measuring the extent of implementation and not only the pure usage

[8] ROA=Total assets/net Income
[9] ROE=Net Income/Average shareholders' equity
[10] TSR=(Ending stock price - Beginning stock price) + Sum of all dividends received during the measurement period
11 https://msm.gov.om

or implementation. Therefore, it will apply all BSC criteria to measure the extent of implementation, which none of the previous studies have done so far.

Since the measurement of the extent of BSC implementation variable required the use of all BSC implementation criteria (Kaplan, 2008), more than one item is required to measure it. This study uses five items in the questionnaire (BSCI1-5) to measure the level of BSC implementation in firms. Different from previous research that considered performance measures only, this study considers (i) the use of both financial and non-financial performance measures, (ii) there is cause-and-effect relationship between performance measures in use, (iii) there is alignment between the firm's strategies and performance measures, (iv) there are targets set for all performance measures in use and (v) there is a link between target achievements and the firm's reward system, when measuring the extent of BSC implementation.

4.3.2.5 Success factors of BSC implementation

Three key factors were found to be associated with the success of BSC implementation, namely management support, linking the implementation with the firm's incentive plan and the needs to implement BSC at different business units of the firm (Kaplan, 2008). This study measures the extent to which firms are implementing these three factors in order to investigate their impact on the success in BSC implementation.

Six questions in the questionnaire are designed to measure the extent of use of the three success factors. Question BSC4 in the questionnaire is designed to measure the extent of implementing BSC at different business units of the firm. The design of the question is adapted from Speckbacher et al. (2003). However, Speckbacher et al. (2003) designed the question to find out how many firms implement BSC at each business unit of the firm, and not to measure the extent of BSC implementation at different business units of the firm.

Three questions (BSC6, BSC7 and BSC8) are used to measure the level of support provided by management to BSC implementation. QuestionBSC6 is designed in this study to find out if the BSC implementation is supported by management. The question asks the participants to select the type of support the management provides for BSC implementation. Questions BSC7 and BSC8 are adapted from (De Geuser et al., 2009) to measure the level of support and involvement of management in BSC implementation. De Geuser et al. (2009) used them to find out if management support and involvement in BSC implementation contribute to firms' performance. This study will use them to assess the impact of management support and involvement on the firm's success in BSC implementation.

To measure the extent of linking firms' incentives plans to BSC implementation, two questions, BSC9 and BSC10, were included in the questionnaire. Question BSC9 is meant to identify firms that link their incentive plans to BSC implementation. Question BSC10 is designed to measure the extent of the link between firms' incentive plan and BSC implementation, which is investigated for the first time through questionnaire.

4.3.2.6 Level of success in BSC implementation

The operational success in BSC implementation has received scarce attention in the literature. De Geuser et al. (2009) examined the success of BSC implementation by measuring its impact on firm performance. They argue that if there is link between BSC implementation and firm performance, the implementation can be considered successful. However, the measure of success in BSC implementation based on its impact on firms' performance is an indirect measure. This study aims to measure the success of BSC implementation directly by investigating the extent to which each firm considers the success criteria for BSC implementation. These criteria are the one used for measuring the extent of implementation in section 4.3.2.4 above. In order to measure the success in BSC implementation this study designed question BSC11. This question is designed based on question BSC5 that measures the extent of BSC implementation. So, in question BSC11, participants are asked to measure their success in implementing all of the criteria considered important in BSC implementation (BSCS1-5). In order to find the overall success in BSC implementation, we added question BSCS6, which provides the overall level of success.

In this study the success in BSC implementation is a latent variable [12] that can be measured using the observed value of (BSCS1-6) in the questionnaire

[12] Latent variable refers to variables that are not directly observed but are rather inferred or measured using other variables that are observed (directly measured).

design. To measure the success in BSC implementation, this study consider that firms are successful in (i) measuring both financial and non-financial performance, (ii) creating cause-and-effect relationship between performance measures in use, (iii) aligning firm's strategies and performance measures, (iv) allocating targets to all performance measures in use, (v) linking target achievement and the firm's reward system, and (vi) overall BSC implementation when measuring the success in BSC implementation.

4.3.2.7 Control variables

Most of the research conducted around IC and BSC controlled for firm age and size (e.g. Youndt et al., 2004; Hoque and James, 2000). This study will also apply a firm's age and size as control variables. The information on firm age is collected using the firm website while the information regarding firm size is collected using question number 2 in the first section of the questionnaire. The question asks the participants to provide information about the number of employees the firm has. The number of employees measure firm size and the year of foundation helps in calculating the firm age.

4.3.2.8 Relationships of variables and endogeneity issue

Some can argue that there is an endogeneity problem in the relationship between different variables. However, the proposed relationships between the research variables are based on theory and extracted from different research findings. For example, the relationship between IC and CA. Whilst it is argued that IC should help build CA, one could also potentially argue that firms with stronger CA will be better able to build their IC. The expected relationship between IC and CA is drawn from the RBV theory that argues that the accumulation of the most strategic resources (IC) will lead to better firm competitiveness ability (Barney and Arikan, 2001). Moreover, Kamukama et al. (2011) found that as IC investment increase, firm CA increase accordingly.

Another example is the relationship between the extent of BSC implementation and FP, whilst the extent of BSC implementation can be expected to affect firm performance, one could also potentially argue that firms that perform better are more likely to implement BSC. This relationship is heavily investigated in the literature and studies found that BSC implementation leads to better FP. Davis and Albright (2004) in their experimental study found that bank branches that implemented BSC outperformed the branches that did not implement BSC. Another study conducted by De Geuser et al. (2009) also proved that BSC implementation leads to a firm's success and better productivity. Other relationship are also proposed based on previous literature and theories. Based on the above argument and findings, it can be seen that endogneity is not a problem in this study.

4.3.3 Questionnaire administration

The questionnaire design was converted to an electronic version and participants are provided a link. The questionnaire was designed with Moodle 261 software. This software was selected because it is used by my workplace (Ibra College of Technology) for different system evaluations by both employees and students, so it is free of charge. The participant can directly fill in the questionnaire form and the information is automatically collected in the specific database allocated by the researcher. The link for the questionnaire was sent to the target respondents via LinkedIn and email. Sampled firms that potentially have internet access difficulties were visited in person with hard copy questionnaires were distributed. Those hard copy questionnaires were later collected in person as well. The participants are given up to three weeks to complete the questionnaire. Those who failed to submit/return the questionnaire by three weeks' time were reminded once through e-mail and a phone call with an aim to increase the response rate.

4.3.4 Interview

The second method used for data collection in this study is semi-structured interviewing. As mentioned earlier interview participants are volunteers that were questionnaire participants. The questionnaire participants are asked at the end of the questionnaire if they are willing to participate in an interview to discuss the questionnaire issues further. Interviews were conducted after conducting the questionnaire and analysing participants' answers. Participants were asked for their opinion about the hypothesised relationships in order to provide explanations for each of the hypotheses proposed. The interview guide is provided in Appendix A.2.

There are three types of interviews: structured, semi-structured and unstructured interviews (Robson, 2002). Robson (2002) provides a comparison between the three types of interviews. First, structured interviews always have predetermined questions, use the same wording and the order of the questions has to be set in advance. Second, semi-structured interviews are like the structured interviews in that they have predetermined questions; however, the order of the questions can be changed based on what the interviewer thinks is the most appropriate. Moreover, the wording of the semi-structured interview can be changed by the interviewer with justifications provided for any changes made. The interviewer can also omit inappropriate questions or add new questions when needed. Finally, unstructured interviews are used when the interviewer has a general area of interest and lets the discussions flow within his/her area of interest.

The main objective of conducting the interviews in this study is to understand, support and explain the findings from the questionnaire survey. There are many advantages for collecting information using interviews, especially semi-structured or in-depth interviews. Austin (1981) argues that an interview has the potential to overcome the weak response rate from questionnaires. The interview provides an opportunity to assess the validity of the participant's answers while observing his/her non-verbal actions, and it is also useful for exploring participants' beliefs, values, attitudes and motives (Smith, 1981). It also provides comparable information by ensuring that all participants respond to all questions and ensuring that participants depend on him/herself when answering the questions (Bailey, 1987).

Therefore, this study will use the semi-structured interview. This approach allows the researcher to focus on some aspects in order to get in-depth understanding. Moreover, the researcher can change the wording of some questions or delete add new questions suitable to understanding the causal relationships under investigation.

4.4 The research context

As discussed in the literature review Chapter 3, whilst there had been a number of studies examining the impact of firms' level of IC (e.g. Youndt et al., 2004; Tayles et al., 2007) and BSC implémentation (e.g. Davis and Albright, 2004; De Geuser et al., 2009) on FP, there had been few or limited studies conducted in Gulf countries. This study focuses on firms in Oman. In 1994, the sultan of Oman, Qaboos Bin Saeed, announced 'Oman Vision 2020', the objective of which was to provide guidance for Omanis to achieve economic balance and sustainable growth (Ministry of Development, 1996)[13]. One major part of Oman Vision 2020 is the focus on human resources development as the main source of economic balance and sustainable growth. The focus of the vision is on human resources development, research and development and technology by the government in Oman (Al-Lamki, 2000), and its heavy investment in those areas has resulted in/led to greater focus on the development of IC in firms in Oman. Firms have increasingly implemented frameworks/tools to measure and manage such assets (Al-Hamadi et al., 2007). These would have put Omani firms in the right place for this study.

4.5 Research sample

Luft and Shields (2003) argue that it is important to identify the unit of analysis before deciding the sample, as that will help researchers decide on the right sample. Since all previous studies on IC (e.g. Youndt et al., 2004; Reed et al., 2006; Tayles et al., 2007) and BSC implementation (e.g. Hoque and James, 2000; Malmi, 2001; Speckbacher et al., 2003; Davis and Albright, 2004; Crabtree and DeBusk, 2008; De Geuser et al., 2009) used firms as the unit of analysis for analysing performance, this study will apply the same.

Based on the unit of analysis and context of study, this study focuses on firms operating in the Omani market. Given that it is found in previous studies that large firms tend to have greater IC (Youndt et al., 2004; Reed et al., 2006), this study focuses on large firms, both listed and non-listed. Youndt et al. (2004) argue that firm size may positively affect the development of IC given their greater access to resources. In addition, the level of BSC usage is found to be higher in large firms (Speckbacher et al., 2003; De Geuser et al., 2009). This is in line with the argument made by Hoque and James (2000) that small firms do not require frequent elaboration in their performance evaluation tools, because strategy setters are the owners who are very close to the actions. In addition, Libby and Waterhouse (1996) posit that as the firm size increases, accounting and control

[13] Ministry of Development (1996) 2020 Vision for Oman’s Economy, Special Edition. Muscat, Oman

processes tend to become more specialized and sophisticated, and thus there is an increased need for BSC implementation. All the above cited studies used number of employees as a proxy for firm size.

The Public Authority of Small and Medium Enterprise Development in Oman provided clear definitions for micro, small and medium sized enterprises[14]. The two key criteria for defining firm size are sales turnover and number of employees. Enterprises that employ between 1 to 5 employees and generate annual sales of less than RO 100,000 area classified as micro-enterprises. Small enterprises are the ones that employ 6 to 25 employees and generate annual sales of between RO100,000 and RO 500,000. Medium-sized enterprises employ 25 to 99 employees and generate annual sales between RO 500,000 and RO 3,000,000. However, given the definitions of firm size are different in different countries in the world (Al Barwani et al., 2014), this study used a self-devised threshold to define large firms in Oman.

In order to set the appropriate selection criteria, a preliminary investigation was conducted via LinkedIn to find out which Omani firms based on size are more likely to invest in IC and implement BSC. The outcome from the preliminary investigation shows that firms with between 100 to 400 employees are less likely to give attention to IC investment and its management, with very few of them showing knowledge about BSC. Therefore, this study includes all the private sector firms, both listed and non-listed, operating in the Omani market with 500 employees and more. The list of firms that meet the criteria is gathered from the Ministry of Manpower, where employment records are kept in the country. The researcher sent a letter to the Ministry of Manpower asking for the list of firms with 500 employees and more. The list provided contain 192 firms including 34 listed firms and 158 non-listed firms. In which 27 listed firms and 80 non-listed firms participated.

The study conducted by Youndt et al. (2004) targeted only the two highest executives (CEO and president) and HR executives for data collection. One of the limitations found with Youndt et al. (2004) is that whilst the authors covered all IC components in their study, they did not consider the department or the

[14] https://riyada.om/en-us/aboutus/Pages/definesme.aspx

section of the firm that managed and controlled the different IC components when selecting the survey participants. On the other hand, whilst other studies took into consideration of the job function of the target respondents, they were focused on one component or element of IC (e.g. (Huselid et al., 1997, Collins and Clark, 2003)). Huselid et al. (1997) studied the effect of human resource management capabilities on FP, and they targeted HR senior managers as participants. Collins and Clark (2003) targeted both HR and social network top managers to investigate the effect of HR practices and social network on FP. Further, by surveying chief marketing executives, Hooley et al. (2005) found that marketing capabilities, including brand and customer loyalty, are positively associated with FP. Li and Zhou (2010) studied the effect of marketing orientation on competitive advantage and firm performance by targeting CEO and senior marketing managers as survey participants. In addition, Chang (2011) examined the association between corporate environmental ethics, green product innovation, green process innovation and CA, targeting managers of a wide range of though related departments, including environmental protection, marketing, production, human resource, and R&D department, as respondents (;Chang, 2011). In line with Youndt et al. (2004), this study investigates the effect of all IC components on CA and FP, as well as the implementation of BSC on all aspects. This then means the need of targeting respondents from different departments of the firm.

There are 192 large private firms with 500 employees and more that operate in the Omani market. These firms classified under 18 industries (classification is provided later in table 5.4 of chapter 5). Similar to previous research that studied IC and BSC, this study is going to target the management of all units that have involvement with any components of IC and development, implementation, use and evaluation of BSC. It is evidenced in the literature that IC components can be found in all parts of firms, including human resources, marketing, operation, and accounting and finance (Huselid et al., 1997; Collins and Clark, 2003; Li and Zhou, 2010; Chang, 2011). On the other hand, studies that investigated BSC implementation targeted managers from different levels of the firm as their respondents (Malina and Selto, 2001, Ittner et al., 2003a, De Geuser et al., 2009). In addition, Tayler (2010) argues that managers who are involved in BSC implementation or selecting any of the performance measures tend to consider it to be more successful than those who are not involved in the selection or implementation of the measures. It is therefore important to target managers at different levels of the firm to ensure views are gathered from people that have different involvement in IC and BSC use/implementation. Thus, the target respondents of this study include managers from top, middle or lower level of management to ensure that views from different management levels are reflected in the measurement of the key variables of interest. The top management level includes positions such as CEO, human resources director, marketing director operation management director or administration director and CFO or accounting and finance director[15]. The middle level includes the second level of management who works under the director and get the direction from top management. This group can include the first person that works under the senior managers or branch managers. The unit level managers include lower level managers who manage the firm's units or departments, different production line management in manufacturing firms or team leaders. The target respondents' names and contact details from the sampled 192 large firms at this stage are identified through various resources, including firm websites, human resource department of firms, and the researcher's current LinkedIn network connections. This resulted in a list of 2,109 managers, who are then contacted personally by e-mail or through HR department to confirm their participation in the research.

Respondents to the questionnaire survey were asked if they were willing to participate in an interview in order to discuss the issues asked in the questionnaire further (see questionnaire in Appendix A.1). Interview participants were therefore identified from the questionnaire respondents, and 35 of them agreed to be interviewed.

4.6 Data analysis methods

It is clear from the three theoretical research frameworks provided in Figures 1.1, 1.2, 1.3 and 1.4 in the introduction chapter along with the questionnaire design that this research requires a complex multivariate method for the quantitative data analysis and hypotheses testing. Thus, this study uses structural equation modelling (SEM) to analyse the data collected via a questionnaire survey. SEM allows the causal relations between the many latent variables involved in this

[15] In the Omani market the title of general manager describes the director of a specific section of the firm.

study, as well as the mediating and moderating effect of some of the variables on the causal relations to be investigated. This section provides a review on what is SEM, the two types of SEM and their differences, and how to use SEM. In addition to the use of SEM, this study also uses SPSS 22 to conduct descriptive analyses and examine the data requirements of SEM.

In terms of the qualitative data collected via interviews, they are analysed using the thematic approach, and this is discussed in more detail later in Section 4.6.6.

4.6.1 What is SEM?

SEM has gained popularity and has become the mostly used statistical technique to test theories in various disciplines (Schumacker and Lomax, 2004). The method is known for its ability to expand the explanatory power, as well as its statistical efficiency in testing multivariate frameworks in one comprehensive model (Hair et al., 1998; Hair, 2010). Nusair and Hua (2010) define SEM as a statistical tool that is used to establish both measurement and structural models in order to address complex behaviour relationships (Nusair and Hua, 2010). According to Hair et al. (2010, p.634), SEM is also known as the following:

> *'a multivariate technique combining aspects of factor analysis and multiple regression that enables the researcher to simultaneously examine a series of interrelated dependence relationships among the measured variables and latent constructs (variants) as well as between several latent constructs'*.

The main benefits of using SEM have been argued to be twofold, i.e. it allows for a series of estimation of independent multiple regression equations at the same time, and it has the ability to integrate latent variables into the analysis while accounting for any measurement error during the process of estimation (Hair et al., 1998). The main feature of SEM is to compare the designed model with the data, which leads to fit-statistics that assess the match between the model and the data. So, if there is a proper fit between them, then the hypothesized relationship between latent and observed variables in the measurement models and the dependency assumption between various latent variables in the structural model are considered to be supported by the data (Byrne, 2013). In addition, Nusair and Hua (2010) compared multivariate regression with SEM and found that the use of the SEM is much better for providing significant relationships.

There are two types of SEM, namely, the covariance-based (CB-SEM) and partial least square (PLS-SEM). Although, CB-SEM and PLS-SEM differ in terms of their basic assumptions, estimation procedures, and outcomes (Hair Jr et al., 2016), the two approaches are used for the same purpose of analysis, i.e. '*cause–effect relations between latent constructs*' (Hair et al., 2011, p. 139). In order to decide which approach to use, it is important to understand the differences between the two approaches, which are discussed in the next section.

4.6.2 Differences between CB-SEM and PLS-SEM

When it comes to SEM, CB-SEM is most commonly considered and used, which is usually conducted using software of either Amos, LISREL, MPLUS or EQS (Hair et al., 2011). However, another approach that is available, though less popular, is PLS-SEM (Henseler et al., 2014; Hair Jr et al., 2016). The PLS-SEM can be applied using different software such as matrixpls, plspm, semPLS, SmartPLS, ADANCO, PLS-GUI, PLS-Graph and WarpPLS, amongst which SmartPLS is the most commonly used (Temme et al., 2010).

The two approaches, CB-SEM and PLS-SEM, are similar in testing measurement and structural model, however they are different in their analysis objectives, statistical assumptions and in providing fit indices (Gefen et al., 2000). The CB-SEM approach applies maximum likelihood estimation procedure, reproduces the covariance matrix by minimizing the differences between observed and estimated covariance, and aims at achieving good model fit (Hair Jr et al., 2016). On the other hand, PLS-SEM follows ordinary least squares estimation method and aims at minimizing the error terms and maximising the explained variance of the dependent latent variable (Ringle et al., 2012; Hair et al., 2011). Hair et al. (2010) argue that CB-SEM focuses on the theoretical fit of the analysed model, whereas the PLS-SEM produces parameter estimates which can be used for relationship prediction. The CB-SEM evaluates null hypothesis of the entire model and this evaluation is used to examine the model overall paths that are proposed according to theories (Hair et al., 2011), whereas, PLS-SEM aims at showing high R2 and significant t-values, which is similar to linear regression for testing null hypothesis (Gefen et al., 2000).

As discussed above, the two approaches differ in the objectives of their use. However, their differences are not only on their objectives of implementation. Other differences include, for example, CB-SEM approach requires a number of assumptions to be met before starting the model evaluation such as the normality of data, number of indicators[16] per latent variable and required a large sample size for successful implementation (Hair et al., 2011). These assumptions are usually hard to be met specially in business research, and without meeting these assumption the estimation parameters of the model will not be precise (Hair et al., 2010). On the other hand, the PLS-SEM is found to be capable of handling small sample size, without the need to consider the normality in data distribution, and permits the use of latent variable with one or two observed variables. Whilst both approaches have their own advantages, it is advised that CB-SEM should be used when all the assumptions are met (Byrne, 2013).

Latent variables are known by being difficult or impossible to be directly measured. So they always require measurement models of observed variables or indicators. The CB-SEM always assumes that observed variables are reflective in nature. In that, it assumes that in all measurement models, the observed variables reflect the measured latent variable (Hair et al., 2011; Hair Jr et al., 2016). However, not all observed variables in social research are caused by the construct. There are formative latent variables where the latent variables are caused by the observed variables, and thus the direction of the relationship is from the observed variables to the latent variables (Diamantopoulos and Siguaw, 2006; Coltman et al., 2008; Baxter, 2009). This type of latent variable, i.e. formative late variables, is better analysed using PLS-SEM. Therefore, when models containing formative or mix of formative and reflective latent variables better to be analysed using PLS-SEM (Hair Jr et al., 2016).

The above discussions show that CB-SEM and PLS-SEM are different but complementary approaches, and the advantages of one are the disadvantages of the other and vice versa (Hair et al., 2012). Accordingly, researchers can choose the approach that is suitable for their research targets, type of data and the complexity of their research model (Hair et al., 2011; Hair Jr et al., 2016). This study applies PLS-SEM for the data analysis due to three reasons. First, the data

[16] Indicators are the observed variables measured using the questionnaire

collected fails to meet the multi-normality[17] assumption required by CB-SEM. Second, the model of this research is complex due to the number of indicators involved per latent variable, the inclusion of mediator and moderator relationships and the need to accommodate twenty research hypotheses. Third, the model consists of formative latent variables which cannot be handled by CB-SEM. Section 4.6.3 below provides further discussion on the differences between reflective and formative latent variables and how the research variables of this study are classified.

4.6.3 Reflective versus formative latent variables

CB-SEM and PLS-SEM are both implemented in two stages, which are measurement model and structural equation model; and both can be distinguished in several ways. One of the major differences between CB-SEM and PLS-SEM stems from the way they analyse the measurement model. Anderson and Gerbing (1982, p.453) stated that "the reason for drawing a distinction between the measurement model and the structural model is that proper specification of the measurement model is necessary before meaning can be assigned to the analysis of the structural model". They argue that good measurement of the latent variable is a prerequisite to analysing any causal relationship between latent variables. Law and Wong (1999) proved empirically that misspecification of the causality direction between latent variables and indicators can lead to misleading conclusions on the structural relationship between the research variables. Moreover, Law and Wong (1999) and Diamantopoulos and Winklhofer (2001) demonstrated some potential serious consequences of misspecification of the measurement model and advised researchers to be careful when assessing causality between constructs and indicators.

Most scholars assume that the relationship between constructs and indicators is reflective in that the change in an indicator reflects the change in the latent construct, so the causality of the reflective measurement model is assumed to flow from the constructs to the indicators (Coltman et al., 2008). However, Diamantopoulos and Siguaw (2006), Coltman et al. (2008) and Hair Jr et al. (2016) argue that it is not logical to assume the reflectivity of all latent constructs

[17] Multi-collinearity is discussed in more details in section 4.6.5.6 below

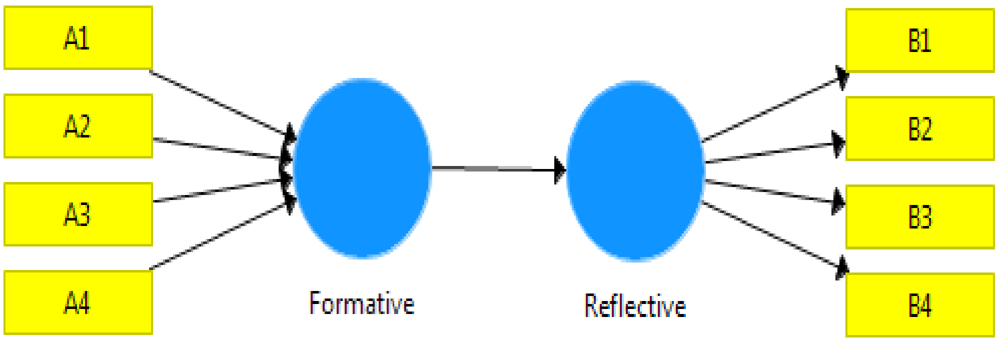
and caution has to be taken with this assumption. In theory and practice, there are two types of measurement models, reflective and formative (Jarvis et al., 2003; Coltman et al., 2008; Hair Jr et al., 2016). The review of the literature shows that few scholars use formative measurement models and many use reflective model while they should not (Jarvis et al., 2003). The use of the wrong measurement model or measurement model misspecification always lead to misleading results for the relationship between the research variables (Diamantopoulos and Siguaw, 2006). Coltman et al. (2008, p.2) also argue that the ''use of an incorrect measurement model undermines the content validity of constructs, misrepresents the structural relationships between them, and ultimately lowers the usefulness of management theories for business researchers and practitioners'. Since the two models are analysed differently, it is very important to classify them before initiating the first stage of analysis.

In the reflective measurement model, 'the indicators are affected by the same applied concept' (Chin, 1998), and in general it implies that the causal relationship is from the construct to the indicators. While in the formative measurement model, the indicators are the cause for the construct, so the impact is informed by the indicators to the construct.

Coltman et al. (2008) argue for the importance of defining the measurement model before implementing any SEM analysis and that the use of incorrect measurement model undermines the content validity of the constructs and misrepresents the structural relationship between different constructs. CB-SEM assumes that the indicators reflect the latent variables, in that the arrows always point away from latent variables to indicators which show that the indicators are caused by the latent variable (Gefen et al., 2000; Hair et al., 2006; Hair et al., 2010) (see Figure 4.1 to differentiate between the reflective and formative measurement models). In the figure, the variables A1 to A4 are the indicators or measures for the formative construct, while B1 to B5 represent the measures for the reflective construct. However, PLS-SEM addresses the issues of both formative and reflective relationships between the variables.

Given that the constructs within this study are mainly formative, except one construct which is considered to be reflective due to being a single indicator construct (see Table 4.4 for a summary), PLS-SEM is considered to be more appropriate than CB-SEM for the data analysis in this study. Table 4.3 explains the differences between reflective and formative measurement models and Table 4.4 explains why the constructs of this study are considered either reflective or formative.

Figure 4.1: The difference between reflective and formative constructs



The evaluation of the measurement model is different between reflective and formative models (Jarvis et al., 2003; Diamantopoulos and Siguaw, 2006; Coltman et al., 2008, Hair Jr et al., 2016). Hair Jr et al. (2016) argue that it is not possible to apply the same statistical evaluation criteria used for both reflective and formative measurement models. Some of the reasons are provided by Jarvis et al. (2003) who argue that formative measurement models are not always associated with high degree of correlation between measures and consider them error free. Based on that, it is suggested that the internal consistency, convergent validity and validity of indicators are less relevant to formative measurement models and supported the relevance of content validity instead (Jarvis et al., 2003, Hair Jr et al., 2016). Therefore, they suggested focusing on indicator relevance based on theory when deciding on its inclusion or deletion.

However, several studies, including Coltman et al. (2008), Hair et al. (2011) and Hair Jr et al. (2016), recommended the use of multi-collinearity and outer weight to test formative construct validity for further analysis. The outer weight represents the weight of the formative indicators within the formative model. (Hair et al., 2011, p.142) define outer weight as 'the result of the ordinary least squares regression of each latent construct's inner proxy on its indicator variables' (p.142). Moreover, Hair et al. (2011) suggested the use of tolerance or the variance inflation factor (VIF) values to test for collinearity. More specifically, Hair et al. (2010) suggested to keep the indicators with tolerance value of more than 0.2, and VIF value of less than 5 and any significant outer weight.

Table 4.3: Reflective versus formative constructs

The distinguishing criterion	Reflective constructs	Formative constructs
Direction of causality	• Causality from construct to indicators • Any changes to the construct causes changes in the indicators	• Causality from indicators to construct • Any changes to the indicators cause changes to the construct
Explanatory power of indicators or construct	• Construct explains the items • Each indicator is a reflection of the overall construct	• Construct is a combination of the items • Each indicator in the formative construct is important for the development of the construct.
Characteristics of the indicators used to measure the construct	• Items are manifested by the construct • Items share a common theme • Items are interchangeable • Adding or dropping an item does not change the conceptual domain of the construct	• Items define the construct • Items need not share a common theme • Items are not interchangeable • Adding or dropping an item may change the conceptual domain of the construct
Indicators **inter-correlation**	Items should have high positive Inter-correlations • Empirical test: internal consistency and reliability assessed via Cronbach alpha, average variance extracted, and factor loadings (e.g., from common or confirmatory factor analysis)	Items can have any pattern of inter-correlation but should possess the same directional relationship. • Empirical test: indicator reliability cannot be assessed empirically; various preliminary analyses are useful to check directionality between items and construct

Note: Adapted from (Jarvis et al., 2003), (Coltman et al., 2008) and (Hair Jr et al., 2016)

Continue table 4.3: Reflective versus formative constructs		
The distinguishing criterion	**Reflective constructs**	**Formative constructs**
Measurement model Evaluation tools	- Indicator reliability: Standardized item loading ≥0.70 for exploratory research, but 0.4 considered acceptable - Internal consistency reliability: Cronbach's alpha (conservative measure); composite reliability ≥0.70 (in exploratory research 0.60 is considered acceptable). - Convergent Validity: AVE ≥ 0.50 - Cross loading: Each indicator should load highest on the construct it is intended to measure. - Discriminant validity: Each construct's AVE should be higher than its squared correlation with any other construct.	- Indicators' relative contribution to the construct: Report indicator weights. - Significance of weights: Report t-values, p-values. - Multicollinearity: VIF < 5 / tolerance > 0.20
Note: Adapted from (Jarvis et al., 2003), (Coltman et al., 2008) and (Hair Jr et al., 2016)		

Table 4.4: Classifications of constructs of this study		
The construct or the research variable	**Reflective or formative**	**Reason for classification**
Human Capital (HC)	Formative	- Causality is from indicators to construct (theoretically and conceptually all indicators are components of HC). - Deleting one indicator will affect the value of HC. - Indicators are un-interchangeable, and all are important. So one indicator cannot represent the other.
Structural Capital (SC)	Formative	- Causality is from indicators to construct (theoretically and conceptually all indicators are components of SC). - Deleting one indicator will affect the value of SC. - Indicators are un-interchangeable, and all are important. So one indicator cannot represent the other.

Continue Table 4.4: Classifications of constructs of this study		
The construct or the research variable	**Reflective or formative**	**Reason for classification**
Relational Capital (RC)	Formative	- Causality is from indicators to construct (theoretically and conceptually all indicators are components of RC) - Deleting one indicator will affect the value of RC. - Indicators are un-interchangeable, and all are important. So one indicator cannot represent the other.
Intellectual Capital (IC)	Formative (Second order18)	- Causality is from indicators to construct (theoretically and conceptually HC, SC and RC are components of IC). - Deleting one indicator will affect the value of IC. - Indicators are un-interchangeable, and all are important. So one indicator cannot represent the other.
Competitive Advantages (CA)	Formative	- Causality is from indicators to construct (theoretically and conceptually all the indicators create the firm CA) - Deleting one indicator will affect the value of CA. - Indicators are un-interchangeable, and all are important. So one indicator cannot represent the other.
Firm Performance (FP)	Formative	- Causality is from indicators to construct (theoretically and conceptually all the indicators create the FP) - Deleting one indicator will affect the value of FP. - Indicators are un-interchangeable, and all are important. So one indicator cannot represent the other.

[18]. Second order formative indicate that this construct value is based on first order constructs (In this case HC, RC and SC are the first order constructs and they constitute the IC which is the second order. They are formative because the construct value is informed by the first order constructs values.

Continue table 4.4: Classifications of constructs of this study		
The construct or the research variable	**Reflective or formative**	**Reason for classification**
BSC Implementation Extent (BSCImpL)	Formative	- Causality is from indicators to construct (theoretically and conceptually the indicators are the criteria firms must consider to implement BSC). - Indicators are un-interchangeable. Deleting one indicator will change the meaning and the level of BSC implementation.
BSC Implementation Success	Formative	- Causality is from indicators to construct (theoretically and conceptually the success in implementing all the indicators will lead to overall success in BSC). - Indicators are un-interchangeable. Deletion of one indicator will change the meaning and the level of BSC implementation. Therefore it will also affect the meaning of the success in BSC implementation.
BSC Implementation at different business units of the firm (BSCL)	Formative	- Causality is from the indicators to the construct (because the extent of implementing the BSC at different business units of the firm (Construct) is decided by the level of implementing the BSC at every unit of the firm (indicators)). - The increase of the value of the indicators will automatically increase the value of the construct. - If one of the indicators is deleted, there will be omission to one of the firm level where BSC should be implemented.
Management support to BSC Implementation (Top MGMT)	Formative	Causality is from indicators to construct (theoretically and conceptually the management support and involvement levels are the main source of overall management support to BSC implementation).
Incentive link to BSC Implementation (Incentive Link)	Reflective	Single item measuring one construct.

4.6.4 Implementation of PLS-SEM using SmartPLS 3

The previous sections reviewed the differences between CB-SEM and PLS-SEM and explained the use of each approach as well as the reason PLS-SEM is applied in this study. Differences between reflective and formative model evaluation are also discussed, which help to classify the construct of this research.

Building on the reviews provided in the previous sections, this section describes how PLS-SEM using SmartPLS is implemented. Hair et al. (2010) argue that SEM is conducted in two phases for both CB-SEM and PLS-SEM. The two phases are measurement model evaluation and structural model evaluation (Byrne, 2013; Hair Jr et al., 2016). However, the two phases of evaluation are conducted differently for CB-SEM and PLS-SEM (Hair et al., 2011, Henseler et al., 2014). Moreover, the PLS-SEM analysis requirements for reflective and formative measurement models are also different (Hair et al., 2011). Overall, given this study applies PLS-SEM using SmartPLS 3 and most of the measurement models are formative, the implementation phases required by this study are discussed below.

4.6.4.1 Measurement model evaluation

The measurement model evaluation is usually conducted in two stages, i.e. exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) (Byrne, 2013; Hair Jr et al., 2016). The EFA is conducted if the indicators are newly used to describe the measured construct or they are used for the first time in the given context (Byrne, 2013). This analysis is used to reduce the number of indicators by evaluating them and showing which indicators load better on which latent variable (Hair et al., 2006). The CFA is used to measure the measurement model's validity and reliability. It is also used to test the hypothesis that the observed variables or the indicators constitute or reflect the underlying latent constructs (Hair et al., 2011). The EFA application is associated with reflective model evaluation only and not required for formative model evaluation (Diamantopoulos and Siguaw, 2006, Coltman et al., 2008). Since all the research constructs in this study except incentive link are formative, EFA is not applicable. Therefore, the measurement model evaluation is conducted using CFA.

The CFA for the formative measurement model is conducted differently than for the reflective measurement model. In the reflective model, the indicators are created by the underlying construct and they are required to have positive high inter-correlations (Diamantopoulos and Siguaw, 2006). While in the case of a formative model, it is not a necessity for the indicators to share themes and criteria, so the inter-correlation between indicators has no preconceived pattern (Coltman et al., 2008). Although inter-correlation between indicators of a formative model is not considered important or not set as assumption for successful analysis, Hair Jr et al. (2016) stressed the need for the theoretical assessment of the indicators of the formative model to check whether they possess no inter-correlation or high or low inter-correlation. Moreover, it is suggested in Coltman et al. (2008) that indicator inter-correlations should be checked to see if they are according to the expectation. So, preliminary analysis is recommended in order to check for outliers, whether the dimensionality of the construct is according to the research hypotheses proposed, and that the correlations between indicators and constructs are as expected in terms of strength and direction. Techniques such as factor loading and communality, Cronbach alpha, average variance extracted (AVE) and internal consistency have been used in previous studies to assess the composite reliabilities for reflective indicators (e.g. adding some supporting references). However, formative indicators do not assume internal consistency nor high inter-correlations, and thus the above techniques are not suitable for formative indicators.

Based on the above discussions, the measurement model evaluation for the formative model can be conducted in two steps. The first step is to evaluate the level of the collinearity of the constructs (Hair et al., 2013), at which stage redundancy of the indicators can also be tested. The redundancy test is recommended by Hair Jr et al. (2016) to test external validity and it requires the use of globally assessed reflective measures or measures previously designed within the questionnaire. This study does not have reflective measures for any of the latent variables because the classification of the variables into reflective and formative was conducted only after the data collection. The use of an external reflective measure to test external validity or redundancy of formative construct indicators is conceptually questionable because not all constructs can be measured reflectively (Diamantopoulos et al., 2008). However, Hair et al. (2013) argue that indicator information can become redundant due to the level of multi-collinearity, and thus recommended the use of multi-collinearity test to determine redundancy. The redundancy test requires the test of the extent to which indicators correlate with each other within the same construct (Hair Jr et al., 2016). The test of multi-collinearity requires the calculation of tolerance and variance inflation factors (VIF) values. So, the tolerance value below 0.2 and VIF of 5 or above represent high collinearity and this shows that there is high multi-collinearity level between the indicators of the formative construct. Although Kline (2005) and Pallant (2007) suggested to use the tolerance value of more than 0.1 and the VIF value less than 10 as role of thumb for collinearity not being a serious problem, Hair Jr et al. (2016) insist that the tolerance value below 0.2 and VIF value of 5 or above is the rule thumb for PLS-SEM analysis. If the multi-collinearity problem is an issue, then the collinearity problem needs to be resolved first before moving to outer weight test (Hair et al., 2013). Hair Jr et al. (2016) suggested three solutions for this problem: (i) removing the indicator with the collinearity problem, (ii) combining collinear indicators into one indicator by using the average value, weighted average value or factor scores, and (iii) setting up higher formative-formative second order construct (Becker et al., 2012; Ringle et al., 2012). The first solution can be valid when it is theoretically proven that all the remaining indicators still sufficiently capture the content of the measured construct (Ringle et al., 2012). The second solution can be a problem when the individual effect of the indicators become confounded because that can have reversed consequences for the content validity of the combined resulted indicators (Henseler et al., 2009; Henseler et al., 2014). The third solution is valid only when the construct measurement theory supports the use of the second-order construct solution (Hair Jr et al., 2016).

The second step in the formative measurement model analysis is assessing the outer weights. In SEM, the inner model describes the relationship between latent variables only, but the outer model describes the relationship between the latent variables and its indicators (Hair Jr et al., 2016). Therefore, the outer weights are indicator weights on their specific construct. Coltman et al. (2008) and Diamantopoulos and Siguaw (2006) argue that it is important to examine the statistical significance of the indicator weights in order to assess whether the construct is formed by the indicators. The outer weights can be calculated using SmartPLS algorithm and their significance level can be calculated using bootstrapping that is used to calculate both t-value and p-value of the relationship. If any of the indicators show an insignificant value, the outer loading should be used to assess the importance and the contribution of the indicator (Henseler et al., 2014). An indicator with a loading value of 0.5 or above is considered very important and contributes a lot to the formation of the formative construct. If the indicator loading is below 0.5, the indicator should be deleted and only indicators with significant loadings should be retained for further analysis (Hair et al. (2013; Hair J et al., 2016). This is especially the case if the indicator with low loading is not a newly developed indicator or highly supported by theory.

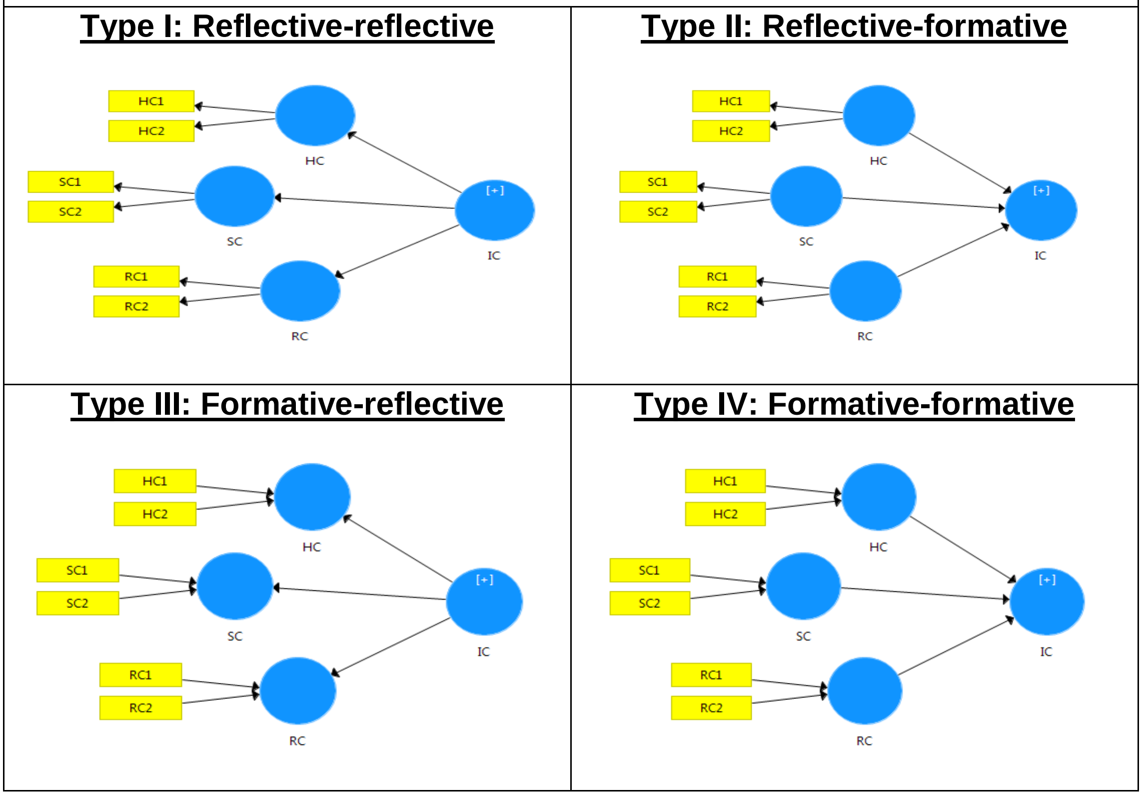
An important point that needs to be considered during measurement model evaluation is that if the model under assessment is a higher order model, then the measurement model criteria need to be established at each level or layer of the model (Ringle et al., 2012, Hair et al., 2013). The higher order model can be second, third or more and they all start with simple or first order constructs. The first order constructs are one layer where the constructs or latent variables are measured by a set of indicators. The second order is two layers model where the latent variable is indirectly measured by a set of latent variables and each of the latent variable is measured by separate equal number of indicators (Becker et al., 2012). If the number of indicators used to describe the first order constructs are not equal, the tested relationships using the second order constructs will be biased.

4.6.4.1.1 Second order analysis

Figure 4.2 shows the second-order models. The models do not represent this study and are just for demonstration. In the models, the latent variables HC, SC and RC are first order constructs and IC is the second order construct. There are four types of second order constructs: (i) reflective-reflective, (ii) reflective-formative, (iii) formative reflective, and (iv) formative-formative second order model (Bruhn et al., 2008, Becker et al., 2012). This study applies type IV for the modelling of IC, as each of the first order constructs HC, SC, and RC are measured using 12 indicators and IC is measured indirectly using HC, SC and RC.

In order to evaluate any second order model, Becker et al. (2012) suggested the use of one of the following three methods: (i) the repeated indicator approach, (ii) the sequential latent variable score method, also called two-stage approach (iii) or the hybrid approach. The repeated indicator approach is modelled by repeating allocating the first order construct indicators twice for both the first and second order constructs (Lohmöller, 2013). The two-stage approach is applied in two stages. The first stage is applied by calculating the first order latent score by linking all the first order constructs with all the structural model constructs but without the second order construct (Chin, 1998). Then at the second stage, the generated latent scores for the first-order constructs will be used as indicators for the second order construct. The hybrid approach is similar to the repeated indicator method, but it divides the first-order construct indicators into half and uses half for the first order and the other half with the second order in one stage to avoid repetition (Wilson and Henseler, 2007).

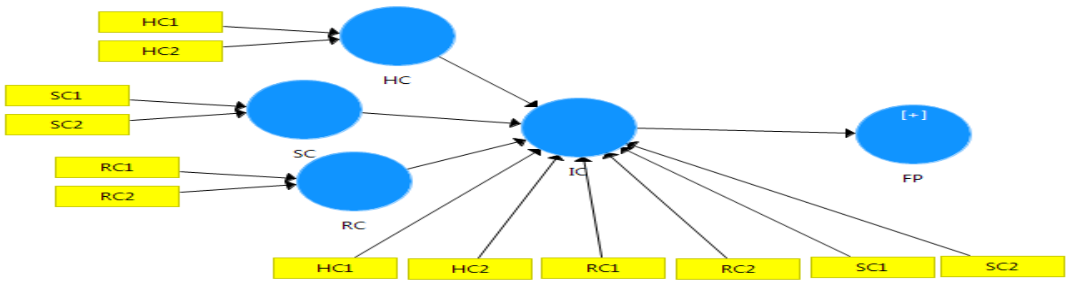
Figure 4.2: Second order model



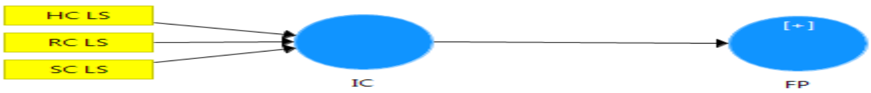
Source: adapted from Bruhn et al. (2008) and Becker et al. (2012)

Figure 4.3: Two stage approach for second order model evaluation

First stage



Second Stage



Source: adapted from (Hair Jr et al., 2016), LS represent latent score

The three approaches can be applied to all four types of the second order models. However, there are serious issues when type III or IV second order constructs are modelled using the repeated indicators approach. When this method is applied almost all of the second order variance is explained by its first order constructs which result in R^2 value close to 1.0, and thus any further path coefficients depend on the second order will be close to zero or very small (Ringle et al., 2012). To solve this issue, (Hair Jr et al., 2016) suggest the use of a combination of the repeated indicators approach and use the resulted latent scores at the second stage. This approach is also known as the two stage approach. The two stages of implementing this approach are shown in Figure 4.3 above. Therefore, based on the discussion above, this study is employing the two stage approach for second order construct evaluation.

4.6.4.2 Structural model evaluation

The second stage is structural model evaluation and this stage helps the researcher assess the relations and the significance of the structural model relationships. The PLS-SEM applies non-parametric bootstrapping, which engages repeated random sampling with replacement from the original sample in order to create a bootstrap sample and this helps to calculate the standard errors for hypothesis testing. This stage does not assume normality, but it assumes that the sample distribution is a good representation of the proposed population distribution (Hair et al., 2013; Hair Jr et al., 2016).

As stated earlier, the PLS-SEM does not apply the model fit criteria applied by CB-SEM. PLS-SEM uses different criteria for structural model evaluation, which are the following: (i) test the collinearity issue between exogenous constructs, (ii) path coefficient (β) estimations and significances, (iii) coefficient of determination (R^2) estimations and significances and (iv) blindfolding for endogenous variables (Vinzi et al., 2010; Henseler et al., 2014). The first three criteria can be applied for both formative and reflective models, but the forth can only be applied to reflective models. Therefore, given all the constructs in this study are formative, only the first three criteria will be applied.

The first criterion involves testing the collinearity issue between the exogenous variables. The exogenous variables here refer to all the latent variables that have an arrow coming in, while the ones that do not have any arrow coming in and only have arrows coming out are called endogenous. In this study all the research variables are exogenous except the incentive link that is single reflective construct and considered endogenous. This step is important to prove that all the exogenous variables present sufficient collinearity as presented in the measurement model evaluation. Based on this any tolerance value above 0.2 and VIF below 5 are viewed as acceptable for the model to be considered suitable for further analysis.

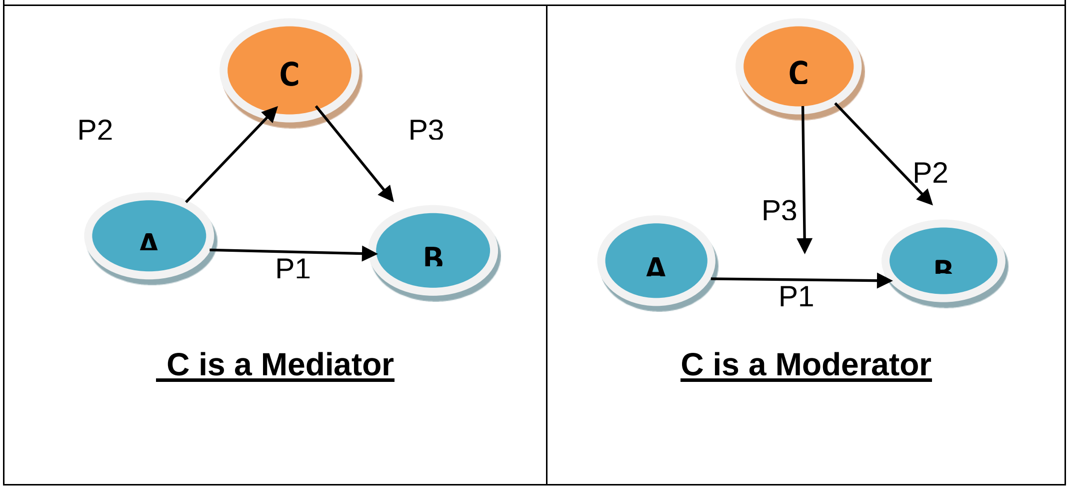
The second criterion is the path coefficients estimation and significances calculation. The path coefficient estimation is calculated using SmartPLS algorithm facility while significances are produced using bootstrapping. In the structural model, each path represents a hypothesis and the t-value describes the significance of the relationship between the variables (Chin, 1998). Therefore, in order to evaluate the significance of a hypothesis, t-value of 1.96 at a significance level of 0.05 can be set as a standard for rejecting or accepting the hypothesised relationship (Hair et al., 2011).

The third criteria is the coefficient of determination R^2. The R^2 value suggests whether the structural model has a good power to explain the proposed relationships between different variables (Hair et al., 2006). It represents the percentage of variance in the dependent variable explained by the independent variables (Abdi, 2010). Hair et al. (2011) argue that it is not easy to decide the acceptable standard value for R^2 because it varies from one discipline to another. Nevertheless, the field of management accounting research considers R^2 values between 0.17 and 0.42 to be acceptable (Vandenbosch, 1999; Chenhall, 2005).

4.6.4.3 Mediator and moderator impact evaluation

The research frameworks of this study include the impact of mediators and moderators. Both mediator and moderator represent indirect relationships. Mediation explains that the relationship between two variables is indirect via a third variable, which is the mediator. Preacher and Hayes (2004) argue that two conditions need to be met when testing mediators: (i) there must be a clear relationship or effect to be mediated, and (ii) the indirect impact should be statistically significant. The authors argue that the relationship is fully mediated by the mediator when the effect of the independent variable concerned on the dependent variable changed from significant to insignificant after introducing the mediator into the analysis. When the effect of the independent variables on the dependent variable becomes smaller but remains significant after the introduction of the mediator, the mediator is considered to be a partial mediator. It is important to make sure that all indirect relationship are significant, before the direct path is tested. The mediator impact can be explained using Figure 4.4. The relationship between A and B is indirect, but goes from A to C and then from C to B. To prove the mediator impact, path coefficients P2 and P3 need to be significant. If any of the relationships is not significant, then path coefficient P1's significance needs to be checked. If P1 is significant, then this suggests that the relation between A and B is direct without mediator, and if P1 is insignificant, then the two variables A and B are not related. However, when both P2 and P3 are significant, the significance of P1 needs to be checked. When P1 is not significant, it suggests that C is fully mediating the relationship between A and B. When P1 is not significant, we have either a competitive partial mediator when P3 is negative or complementary partial mediator when P3 is positive.

Figure 4.4: The difference between mediator and moderator impact



The moderation relationship occurs when the relationship between two variables is not constant but contingent on a third variable, i.e. the moderator. The moderator changes the strength or even the direction of the moderated relationship. It implies that the relationship between the dependent and independent variable is dependent on a third variable called moderator (Frazier et al., 2004).The moderation relationship is usually described by the model in Figure 4.4.

4.6.4.4 Control variables analysis

This study also controls for firm age and size, industry and participants' position to investigate the impact of these factors on the proposed relationships. To test the relationships, this study applies the multi-group analysis (MGA) tool SmartPLS 3. This tool generates the path coefficients analysis for different groups. It also calculates the differences in the path coefficients between different groups and the significance of these differences (Hair Jr et al., 2016). If the differences between groups are significant, indicating that the control variable is important in controlling the relationship between the tested variables.

Before conducting the measurement and the structural models evaluation, the data need to be screened for missing data and outliers. It is also important to test the data for normality, homoscedasticity and sample size sufficiency. These tests are conducted using SPSS 22. The methods of application and rules of thumb are discussed in the next section.

4.6.5 Using SPSS for primary data analysis

SPSS is one of the most widely used programs for data analysis in social sciences (Bryman and Cramer, 1997). This study uses SPSS version 22 to conduct the non-response bias, univariate and multivariate outlier and homoscedasticity tests and to generate descriptive statistics. Each of these tests are discussed separately in the following sections.

4.6.5.1 Non-response bias

Questionnaire surveys are always faced by the non-response bias problem (Armstrong and Overton, 1977). Low response rates affect the validity and the reliability of the findings (Lahaut et al., 2003). The non-response bias happens when respondents and non-respondents answer the given questions differently. In such case, the population parameters of the measured variables can be either over or under estimated (Lambert and Harrington, 1990). However, the low response rate does not always mean that there is non-response bias (Lahaut et al., 2003).

Different methods have been suggested for testing the non-response bias. According to Wallace and Mellor (1988), there are three methods for testing the existence of non-response bias: (i) comparative analysis of responses by date of receipt, (ii) comparative analysis of respondents' profile in terms of known characteristics of a sampled population, and (iii) comparative analysis of demographic characteristics of respondents and non-respondents. According to Van der Stede et al. (2005), the most commonly used method in management accounting research is the first. Due to the limited information available for the second and third method, the first method is applied in this study. In this method, the late respondents are considered as the non-respondents. Armstrong and Overton (1977) suggested that, if there are significant differences between the early and late received questionnaires, it is assumed that individuals who responded late are more similar to non-respondents, and this means that the survey had a non-response bias. To test the differences between early and late responses, this study uses t-test. T-values of 1.96 with p value < 0.05 are considered significant.

4.6.5.2 Descriptive statistics

Descriptive statistics are statistics that used to quantify, describe and summarize the characteristics of a collection of information (Mann, 2007). It describes the data distribution. The most commonly used measures in describing datasets are measures of central tendency and dispersion (Trochim, 2006). The measures used for central tendency are mean, median, mode, minimum and maximum, while those measuring dispersion include standard deviation, kurtosis and skewness. Descriptive statistics are an important part of data analysis because they provide initial view about the nature of the data before starting the main data analysis (Tabachnick and Fidell, 2007). This study uses the mean to describe the central tendency of the data and uses minimum, maximum, standard deviation, kurtosis and skewness to measure data dispersion.

4.6.5.3 Missing value test

This step of data screening is one of the most important problems that needs to be dealt with in the process of data analysis. Missing values is a common problem in many research areas, and it is one that can influence the research objectives and results. In a questionnaire survey, one of the most common reasons for missing data is having a long questionnaire, as the respondent may accidently miss completing some questions (Dillman et al., 1993; Jepson et al., 2005). Other reasons can be due to stress, fatigue, the question not being applicable to his/her situation, some questions being sensitive or a lack of knowledge (Baruch and Holtom, 2008). According to Hair et al. (2010), missing values may affect the generalisability of research findings. Moreover, according to Hair, et al. (2010), missing data does not cause serious concern if less than 10% of total observations are missing. The most common approaches to deal with missing data are maximum likelihood (ML) and Bayesian multiple imputation (MI) (Schafer and Graham, 2002).

However, the problem is considered to be less serious if few data points are missing. For example, if 5% or less of the data are missing randomly from a large dataset, the problem is less serious and easy to handle (Tabachnick and Fidell, 2007). In this case, it is recommended to replace the missing values (Hair et al., 2010). However, it is important to check the data for any systematic pattern on the missing data or it is missing randomly (Tabachnick and Fidell, 2007). This study uses Little's MCAR test to investigate the pattern of the missing data (Little, 1988). This method assumes that data is missing completely at random and relies on calculating Chi-square and p-value to check the significance of pattern existence. So, a test with p-value less than 0.05 suggests that the data missing have systematic pattern, in which case the missing data need to be treated either by deleting the case or removing the measured variable with missing values issue (Schafer and Graham, 2002). The cases and the variables with missing values are important to studies and need to be treated seriously before taking deletion decision, especially when there is a low response rate (Hair et al., 2006). However, a test with a p-value of greater than 0.05 suggests that the data do not suffer from any systematic error, and there is more flexibility in for the treatment of missing data.

There are many methods used for missing data treatment including list-wise deletion, pair-wise deletion, mean substitution, regression imputation, tree-based imputation, neural network imputation, the expectation maximization algorithm and multiple imputation (Schafer and Graham, 2002). The imputation methods are recommended over the deletion methods because data deletion make the data less generalizable (Hair et al., 2010). The most common imputation method used for social researches especially with very low missing data percentage is mean substitution (Hair Jr et al., 2016). The simplicity of its application makes it more popular. This study uses the mean substitution method for replacing the missing value. This method involves the calculation of the mean for each variable and then replaces any missing value with the calculated mean. This method has a limitation that the variance of the imputed data statistically underestimates the real variance of the main data especially when a small dataset is used with a lot of missing data (Little and Rubin, 2014). This study is less affected by this limitation given the large dataset and low missing data percentage. Missing data calculations and treatments are discussed in the Quantitative Data Analysis chapter, in section 5.6.1.

4.6.5.4 Univariate and multivariate outlier test

An outlier is a value or an observation that has abnormal distance from other values in randomly collected data. Outlier analysis is needed in order to test whether any variables had a score different to others (Field, 2009). Both univariate and multivariate outliers need to be screened to ensure normality. Univariate outliers appear when a data point include extreme values on a single variable, while multivariate outliers represent an aggregation of unusual scores in more than one variable (Kline, 2005, Hair, 2010). Outliers can occur for four key reasons, including wrong data entry, failing to identify or to give codes for missing values, the case is not among the intended sample and the sample distribution for a specific variable is not normal or the existence of a valid but exceptional data point within the dataset (Tinsley and Brown, 2000; Osborne and Overbay, 2004; Hair et al., 2006). It is important to deal with data outliers before moving to the main data analysis because they cause the production of misleading outcome of statistical analysis (Tabachnick and Fidell, 2007). Moreover, outliers can also cause mean score bias and standard deviation inflation (Field, 2000).

The most common test used for detecting univariate outliers is the frequency distributions of standardized values or z scores (Mertler and Reinhart, 2016). This involves the calculation of the z scores of all the collected data. The z scores are then checked for extreme values. This method suggests that if the z score is greater than 3.29 with $p < .001$, it indicates that there is a univariate outlier (Tinsley and Brown, 2000). If there is a case where outliers occurred more frequently with many variables, then it is suggested to exclude the case from the dataset before the main analysis (Mertler and Reinhart, 2016).

Previous studies used Mahalanobis Distance, Centred Leverage and Cook's Distance for detecting the multivariate outliers (Hair et al., 2011). This study applies the Mahalanobis Distance test for detecting multivariate outlier. Mahalanobis distance (D^2) is defined as the 'distance of a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all the variables' (Tabachnick and Fidell, 2007, p. 74). It is suggested that if D^2/degree of freedom (df) value of the test exceeds 2.5 in small samples and 3 to 4 in large samples, there is the presence of outliers (Hair et al., 1998). It is therefore suggested that cases with value of D^2/df above 4 are removed (Hair et al., 2010).

4.6.5.5 Homoscedasticity test

Homoscedasticity assumes that all dependent research variables exhibit equal levels of variance across the values of all predictors or independent variables (Hair et al., 2010). Gujarati (2014) argues that homoscedasticity is needed for multivariate analysis as the variance of the dependent variable in the given relationship should not be intensified in just a limited range of independent values. Thus, homoscedasticity is one of the most important statistical assumptions to be tested before performing multivariate analysis (Hair et al., 2010).

There are two common ways to test homoscedasticity. One can apply the graphical method by plotting the measured dependent variables against their standardized residual values and/or by applying statistical method such as Levene test (Field, 2009, Hair et al., 2010). Homoscedasticity is known as homogeneity when data are grouped. In that the distribution of variances of the dependent variables should be constant and all random variables should hold the same fixed variance (Tabachnick and Fidell, 2007, Altunkaynak, 2010).

Plotting the actual values of the measured variables against their residual values provides a visual examination of the homoscedasticity test. This method is beneficial because the assumption of homoscedasticity can be easily analysed and any violation can be quickly determined. Tabachnick and Fidell (2007) suggest that to meet the homoscedasticity assumption, the residuals and their variances must be the same for all predicted scores. In this case the scatter plot should approximately take a rectangular shape, and the scores are distributed around the centre, i.e. the 0 point, in a pattern of rectangle. The case of systematic pattern or clustering of scores is considered violation of the homoscedasticity assumption.

The Levene's test is a statistical tool to assess the homoscedasticity or the equality of variances. It tests the null hypothesis that variances of the population are the same or equal (Levene, 1960). This test uses the p-value to assess the significance of the differences between variances. So, if the p-value of the test is less than the significance level of 0.05, there is significant difference among the variances of the whole population, suggesting violation of the homoscedasticity assumption.

4.6.5.6 Multi-collinearity test

Multi-collinearity occurs when independent variables in a research model are strongly associated with each other (Field, 2009). It is known as 'the extent to which a construct can be explained by the other constructs in the analysis' (Hair et al., 2006, p.709). It also implies a linear relationship between two or more independent variables. Hair et al. (1998) argue that, in a case of linear relationship between independent variables, it is hard to compute the estimate of the regression model uniquely. Multi-collinearity is considered an important issue in SEM applications because highly related measures can result in improper statistical operations (Weston and Gore, 2006).

The two most commonly used methods to test multi-collinearity are bivariate and multivariate correlation matrix and by calculating the variance inflation factors (VIF) with tolerance impact (Tabachnick and Fidell, 2007; Pallant, 2007). Pallant (2010, p.158) states that tolerance is 'an indicator of how much of the variability of the specified independent is not explained by the other independent variables in the model, whereas VIF is the inverse of the tolerance effect'. Some of the indicators of existent of multi-collinearity problem are that the correlation between independent variables of 0.85 or more, the tolerance levels for the variables are less than 0.1 and VIFs are greater than 10 (Kline, 2005; Pallant, 2007). Hair et al., 2010 suggest that the correlation between any two independent variables should not be 0.90 or above, the tolerance levels for the variables should be greater than 0.2 and the VIFs are less than 5, in order for multi-collinearity to not to be a problem.

4.6.6 Thematic approach for qualitative analysis

For the qualitative data analysis, this study applies the thematic analysis approach. This approach is applied to help identify different views and opinions of interview participants. It is defined as a method for analysing, identifying and reporting patterns or themes within the data (Braun and Clarke, 2006). This method provides good data organization and very rich description of data. Thematic analysis is not only restricted to counting phrases or words in a text, but does beyond that to identify hidden and obvious ideas within dataset (Guest et al., 2011). Braun and Clarke (2006) describe the thematic approach as a way to capture the data in relation to the research question and hypothesis as well as representing some level of patterns in participants' responses or meaning within the data.

A theme is a patterned response or meaning generated from the data and it is related to the research questions or research hypothesis of the proposed study (Braun and Clarke, 2006). The theme can occur a number of times within the dataset, but a high frequency of occurrence does not always assume the importance of the theme in understanding the data (Guest et al., 2011). However, the researcher's judgement ability is an important tool to determine the most important theme. The use of research question as a tool to code the themes within the data is considered as a pitfall in the implementation of the thematic approach, because they expect a failure in finding adequate or directly linked examples within the data (Boyatzis, 1998). The main advantages of thematic analysis approach are being flexible and effective analysis method for data collected by interviews because it does not attribute to any pre-defined theoretical framework (Tuckett, 2005). In order to identify the themes, one needs to follow certain coding system suitable for the research objectives. Boyatzis (1998) defines coding as an essential process for developing themes within the interview transcript by selecting important concepts in the data and encoding it into themes before interpretation.

In this study, the interview transcripts are coded according to the research questions and research hypotheses. The questions asked in the interviews that relate to each hypothesised relationship and the answers given by participants in response to these questions represent the themes of the analysis. The themes are later used to support the findings of the questionnaire survey.

4.7 Chapter summary

This chapter introduces the research gaps and research questions, and it provides a list of the proposed research hypotheses. The discussion is then followed by providing a clear description to the development of all the research hypotheses supported by the research framework designs presented by Figures 1.1 to 1.4 in the introduction chapter.

According to the research questions, research hypotheses and the research frameworks, this study uses both a questionnaires survey and interviews for data collection, with the questionnaire being the main method followed by 32 interviews.

This study examines big firms from a number of industries operating in the Omani market. It targets 2005 participants and around 30 interview participants from 192 firms operating within 18 different industries. This sample includes from each of the three top management positions in each of the operating firms in the market. The managers were selected randomly according to the number available in each of the specified firms.

The questionnaire instrument design is also discussed in detail. Both the questionnaire design and interview guide are provided in Appendix A.1 and A.2.

The research design and research framework show the need for multi-variable relationship analysis in order to measure the proposed relationships between the variables. The complexity of the relationships and the data specifications suggest that the PLS-SEM modelling using SmartPLS is suitable for data analysis.

CHAPTER FIVE: DESCRIPTIVE ANALYSIS & DATA SCREENING

5.1 Introduction

The previous chapter discusses the research design, data collection methods and data analysis methods applied for this study. This chapter aims to provide descriptive analysis and screening of the data collected. Tests and preparation of the data collected through questionnaire survey are conducted to ensure the requirements of the main data analysis method, i.e. PLS-SEM, are met. It provides detailed discussions about the final sample including non-response bias, response rate and distribution of respondents, the procedures and results of missing data treatment, and tests of outliers, normality, linearity and variance homogeneity. Other aspects of SEM assumptions, such as validity and reliability, are discussed separately in the Quantitative Data Analysis chapter later. Descriptive analysis of mean, standard deviation, minimum and maximum of the responses of each indicator or measured variable within each variable are provided.

5.2 Non-response bias

As discussed earlier in section 4.6.5 of the Research Methodology chapter, questionnaire survey users are always faced by the non-response bias problem (Armstrong and Overton, 1977) and that this study uses t-test to test the differences between early and late responses for non-response bias. The use of t-test follows the practice of Wu et al. (2008) with an aim to prove that there is no significant difference between early and late responses, and thus non-response bias is not a problem. Data are therefore divided into early and late respondents based on when the questionnaires were returned. The data collection took three months to complete, which started on 1st of May and closed on (31st of July, 2016). This study therefore classifies early respondents as the questionnaires returned in May (n=436) and late respondents as those returned in July (n=289). The two groups were compared in terms of t-value and p-value in order to decide on whether there were significant differences. If significant differences were found between the two groups, the study will have non-response bias problem and the issue needs to be resolved before starting the data analysis. The t-test results are presented in Table 5.1, which showed that there is no significant differences between early and long established responses for almost all items tested (with the exception of six items out of 81 items that have t-value >1.96 and p-value >0.05, i.e. more than 92%), suggesting that non-response bias is not an issue that can affect the validity of the results.

Table 5.1: Independent samples t-test

Measured variable	t-test for equality of means			
	t-value	p-value	Mean difference	Std. error difference
HC1	.779	.436	.076	.097
HC2	.246	.806	.023	.095
HC3	-.317	.752	-.028	.089
HC4	-.325	.745	-.030	.092
HC5	.350	.727	.034	.096
HC6	.509	.611	.051	.099
HC7	.149	.881	.013	.090
HC8	.833	.405	.079	.095
HC9	**-3.496**	**.050**	**-.317**	**.091**
HC10	-.171	.864	-.016	.096
HC11	.476	.634	.049	.103
HC12	-.879	.380	-.077	.088
SC1	-.198	.843	-.019	.096
SC2	1.164	.245	.119	.102
SC3	.773	.440	.072	.093
SC4	.564	.573	.054	.097
SC5	.158	.875	.016	.098
SC6	.381	.703	.039	.102
SC7	-1.170	.242	-.109	.094
SC8	.291	.771	.030	.102
SC9	.256	.798	.024	.095
SC10	1.493	.136	.151	.101
SC11	-.107	.915	-.010	.097
SC12	.344	.731	.033	.097
RC1	-.412	.681	-.037	.090
RC2	.690	.491	.065	.095
RC3	1.273	.204	.123	.096
RC4	.897	.370	.088	.098
RC5	-.223	.823	-.021	.096
RC6	1.551	.121	.154	.099
RC7	.253	.801	.022	.089
RC8	1.249	.212	.124	.100
RC9	.324	.746	.031	.096
RC10	1.107	.269	.114	.103

Note: Bold established text indicate significant differences

Continue table 5.1: Independent samples t-test				
Measured variable	t-test for equality of means			
	t-value	p-value	Mean difference	Std. error difference
RC11	1.774	.076	.167	.094
RC12	1.676	.094	.165	.098
CA1	.116	.907	.010	.088
CA2	.159	.874	.014	.088
CA3	-.722	.471	-.066	.091
CA4	1.649	.100	.165	.100
CA5	-.197	.844	-.018	.090
CA6	1.451	.147	.129	.089
CA7	1.232	.218	.114	.092
CA8	1.177	.240	.118	.100
CA9	1.665	.096	.153	.092
CA10	1.865	.063	.171	.092
CA11	-.984	.325	-.087	.088
CA12	**2.004**	**.045**	**.182**	**.091**
CA13	-.256	.798	-.024	.092
CA14	.616	.538	.059	.097
FP1	-.618	.537	-.123	.199
FP2	-1.419	.158	-.288	.203
FP3	-1.392	.166	-.261	.187
FP4	-.565	.572	-.047	.083
FP5	1.030	.303	.090	.088
FP6	.787	.431	.066	.083
FP7	.634	.526	.054	.086
FP8	.965	.335	.080	.083
FP9	1.508	.132	.133	.088
FP10	.340	.734	.029	.085
FP11	.272	.786	.024	.087
FP12	.074	.941	.006	.083
FP13	1.243	.214	.102	.082
BSCL1	**2.139**	**.046**	**.227**	**.105**
BSCL2	.670	.503	.063	.095
BSCL3	**2.855**	**.015**	**.257**	**.124**
BSCL4	.343	.732	.035	.101
BSCI1	.962	.389	.152	.119
BSCI2	.472	.637	.042	.089
BSCI3	1.123	.150	.055	.091
BSCI4	1.579	.115	.147	.093
Note: Bold established text indicate significant differences				

Continue table 5.1: Independent samples t-test				
Measured variable	t-test for equality of means			
	t-value	p-value	Mean difference	Std. error difference
BSCI5	**4.726**	**.028**	**.332**	**.098**
Involvement	.029	.977	.003	.101
Support	1.165	.057	.339	.092
Incentive Link	1.762	.061	.358	.094
BSCS1	1.126	.261	.101	.090
BSCS2	**5.341**	**.012**	**.495**	**.093**
BSCS3	.774	.439	.070	.090
BSCS4	1.788	.064	.269	.091
BSCS5	.619	.536	.058	.094
BSCS6	0.994	.182	.092	.093
Note: Bold established text indicate significant differences				

5.3 Response rate

The research sample discussed in section 4.5 of the Research Methodology chapter provided explanation of sample size and selection. Based on that, this section discusses the response rate of the sample selected. Since firm size played an important role in deciding on the sample size, it is also considered in the calculation of response rate. The response rate calculation is presented in Table 5.2 below.

Many different techniques were used to improve the response rate: sending introductory e-mail to all available participants highlighting the importance of the research to the firms themselves and encourage participation in both questionnaire and interview survey, providing them with a contact number for more clarifications and details, collecting manually completed questionnaires personally by the researcher, providing the online version of the and sending e-mail reminders to all participants.

It is considered that the reasonable response rate for questionnaires distributed and collected by hands is between 30-59 percent (Saunders and Lewis, 2009). Baruch and Holtom (2008) investigated the response rate of studies published in 17 high ranking academic journals. They found that the average response rate for studies that collected data from individuals was 52.7 percent, while for the ones collected data from organizations was 35.7 percent. This study collected data from organizations using both electronic and hand distribution and collection methods. This study achieved a response rate of 54%, which is acceptable according to both Saunders and Lewis (2009) and Baruch and Holtom (2008).

In order to calculate the response rate, it is important to identify the sample size available within the recommended firms which is explained in the Research Methodology chapter in section 4.5. The number of managers available in each firm differs from one firm to another. Table 5.2 classifies the response rate based on the number of managers available in each firm. The total number of firms identified to be included in this study is 192 of which 107 (56%) firms participated. The total number of managers available within the 192 firms is 2,109 managers from three different levels of management. The total questionnaires received were 1,162 out of 2,109. Among the received copies there were 23 copies excluded due to incompleteness with too many missing values or giving the same answer for most or all of the questions. This reduces the total valid responses to 1,139 managers, which represent a response rate of 54%.

The respondents could also be classified into groups based on firm size, firm age and their management levels. In terms of firm size, whilst all firms sampled in this study are considered as big firms according to the Omani market classification (see section 4.5 of the Research Methodology chapter), they have been further classified into big and very big firms in order to control for firm size effect. The minimum and the maximum number of employees is 500 and 6,793 respectively with a mean of 1,035. Accordingly, firms with a number of employees between 500 to 1,000 are classified as big, and those with more than 1,000 employees are classified as very big firms. Table 5.2 shows that 54% of the respondents were from big firms, whilst 46% were from very big firms.

Table 5.2: Response rate calculation according to firm size

Firm Size	**Sampled firms**	**Firms participated**	**Managers available at sampled firms**	**participants**	**Response rate**
Big firms 500 - 1000 employees	123	61 (49.6%)	1153	615 (53.3%)	54%
Very big firms with > 1000 employees	69	46 (66.7%)	956	524 (54.8%)	46%
Total	**192**	**107**	**2,109**	**1,139**	**54%**

Previous studies show that firm age has major impact on the level of IC and BSC implementation of firms (Hoque and James, 2000; Youndt et al., 2004). Firm age is therefore used as a control variable in this study, which is also considered in the response rate calculation. Twenty years is used as the cut-off point in that firms with 1-20 years of operation in the market are considered as young firms and those operating for more than 20 years are considered as long established firms. The Omani big private firms' age fall in the range between 4 to 52 years with a mean of 25.22 years. Based on that, and for the purpose of controlling for firm age, this study classifies firms that have been in operation for 25 years or less as young firms and those that have been in operation for more than 25 years as long established firms.

As is shown in Table 5.3, the number of responses received were almost evenly split between the two groups, with 51% of the responses coming from young firms and 49% coming from long established firms.

Table 5.3: Response rate calculation according to firm age

Firm Size	**Sampled firms**	**Firms participated**	**Managers available at sampled firms**	**Managers participated**	**Response rate**
Young firms 1 - 25 years	123	73	1375	580 (42.2%)	51%
Long-established firms > 25 years	69	34	734	559 (76.2%)	49%
Total	**192**	**107**	**2,109**	**1,139**	**54%**

To ensure the response variety, the response rate is also calculated based on the three levels of management targeted. The sample include all managers from the three level of management without specifying how many from each level. Table 5.4 shows that the highest number of respondents comes from the middle management level where they represent 46% of the total responses received. This is followed by the low management level (accounting for 35% of the responses) and top management level (accounting for 19% of the responses). The top management level shows the lowest response rate both as percentage of sampled managers and total participated. The anticipated reason might be the low access to this group of people and their heavy work schedule. Although, there is a difference between low and middle management overall response rate, they almost represent similar percentage of sampled managers within their group.

Table 5.4: Response rate calculation according to participants' management level			
Firm Size	**Managers available at sampled firms**	**Managers participated**	**Response rate**
Low level management	677	397 (58.6%)	35%
Middle level management	895	527 (58.9%)	46%
Top level management	537	215 (40%)	19%
Total	**2109**	**1139**	**54%**

5.4 Distribution of participants

The industry within which a firm operates has impact on the level of IC and BSC implementation (Hoque and James, 2000, Reed et al., 2006). Reed et al. (2006) find that the pattern in which IC components associate with each other is different among the personal and commercial banks because the two types of banks differ in customer needs, loans provided, competitors, intensity of competition, and so on. It is therefore important to cover different industries in this study to ensure generalization of the results and findings. This study therefore includes big private firms from all industries except investment given no response was received from the firms concerned. Table 5.6 provides a detailed breakdown of the participating firms based on industry sector. In order to generalize the results and order to classify high and low IC firms; the participating firms cover 17 industries, making it difficult to control. This study therefore re-classified them into four groups, namely (i) technology and communication, (ii) finance and insurance, (iii) trading and services and (iv) manufacturing. The re-grouping of the industries is in line with the industries classified as high IC focus, i.e. (i) technology, (ii) consumer products, (iii) trading and services, and (iv) finance, in studies such as Edvinsson and Malone (1997) and Tayles et al. (2007).

As is shown in Table 5.5, 41.35% of the respondents are from the manufacturing sector, 35.12% are from trading and services, 14.05% from finance and insurance, and 9.48% are from the technology and communication industry.

5.5 Descriptive statistics for main research variables

There are eight main variables examined in this study, namely IC (intellectual capital), competitive advantage (CA), firm performance (FP), BSC implementation extent (BSCImp), BSC implementation success (BSCSucs), firm level where BSC is implemented (BSCL), management support to BSC implementation and incentives linked to BSC implementation. The IC variable is measured using three variables, namely human intellectual capital (HC), structural intellectual capital (SC) and relational intellectual capital (RC). This section provides descriptive analyses on the responses received on each of these variables, including the minimum, maximum, mean, standard deviation, skewness and kurtosis.

Table 5.6 shows the descriptive statistics for all the research variables. As we can see from the table, answers received on majority of the measured variables fall between 1 and 7, except those for CA and FP which fall between 2 and 7, which can be explained by the managers attitudes toward overestimating their performance when they are asked for their perceptions (Wall et al., 2004, Andrews et al., 2010). Nevertheless, the ranges of the answers given suggest that there are high variations in the responses.

Further, it can be seen from Table 5.6 that all measured variables have standard deviation values above 1, suggesting that more than 68% of the variable values fall between 1 and 2 standard deviations from the mean, which represents normal distribution of the data (Norušis, 2006, Pallant, 2010). However, the skewness and kurtosis values suggest otherwise. The values of both skewness and kurtosis are either positive or negative (see Table 5.4), which could indicate that the data might violate the normality of distribution (Mardia, 1970; Joanes and Gill, 1998). The rule of thumb suggests that slight non-normality occurs when skewness value is around 0.3 and 0.4 and kurtosis value is around 1, while severe non-normality happens when skewness value is above 0.7 and kurtosis value is above 3.5 (Lei and Lomax, 2005). It can be seen from table 5.6 that some of the variables with skewness values highlighted in bold may suggest slight non-normality.

However, the normality of data distribution is not an issue for this study because it is applying PLS-SEM for data analysis (see Sections 4.6.2 and 4.6.3 of the Research Methodology chapter for further discussions).

The mean values for most of the measured variables are above 4.5, which is above the average scale of 3.5 on a 1-7 Likert Scale. This provides evidence that participants received slanted more towards agreement with the given issues. The mean scores for CA and FP are in general higher than the means for other variables, which is once again in line with the argument that managers tend to overestimate their firm performance as it represents their performance as well.

The questionnaire gives the respondents the option not to answer questions that are not applicable to their firm or their respective situation. There are therefore some questions with missing values. Nevertheless, it is shown in Table 5.6 that all the measured variables have more than 98% responses, suggesting that all the measured variables are important and applicable to the participating firms and the respondents (Graham, 2009). Thus, this suggests the importance of all the measured variables for the measurement of the main variables for this research.

5.6 Check SEM assumptions and data screening

The previous sections discussed the non-response bias, response rate, distributions of respondents and descriptive statistics for the measured variables of this study. The measured variables here are the variables that are given values by the questionnaire participants. In total, this study is measuring 78 variables and these variables are used to measure 8 latent variables. The seven latent variables are the main research variables of this study and they are the following: IC, BSC implementation extent, the success in BSC implementation, the level where BSC implemented, the management support to BSC implementation, the incentive link to BSC implementation, CA and FP. The analyses in the following sections focus on the screening of the 78 measured variables to check their validity for PLS-SEM analysis. This includes screening for missing values, outliers and testing data for homoscedasticity and multi-collinearity problems.

5.6.1 Missing values

The methods for the identification and replacement of missing values are discussed in Section 4.6.5.3 of the Research Methodology chapter. SPSS 22 is used for screening of missing values in this study.

Table 5.5: Response per industry

	Industry	Total No. of firms available		No. of firms participated		Available managers / industry		Participant / industry		Specific industry classification
1	Communication	5	**12 (6.25%)**	3	**9 (8.41%)**	49	178	26	**108 (9.48%)**	Technology & communication
2	Technology	4		3		52		26		
3	Telecommunication	3		3		77		56		
4	Energy & Power	5	**68 (35.42%)**	3	**43 (40.19%)**	83	691	37	**471 (41.35%)**	Manufacturing
5	Construction	20		9		183		99		
6	Oil & Gas	15		13		192		155		
7	Manufacturing	28		18		233		180		
8	Aviation	1	**85 (44.27%)**	1	**42 (39.25%)**	22	865	10	**400 (35.12%)**	Trading & Services
9	Ports Management	3		2		65		16		
10	Automobile Retailing	6		3		81		27		
11	Education	10		4		104		46		
12	Recruitment	6		4		57		41		
13	Tourism	9		5		53		45		
14	Retailing	26		11		196		98		
15	Services	24		12		287		117		
16	Investment	5	**27 (14.06%)**	0	**13 (12.15%)**	23	375	0	**160 (14.05%)**	Finance & insurance
17	Insurance	7		3		41		36		
18	Banking & Finance	15		10		311		124		
Total		**192**		**107 (56%)**		**2,109**		**1139 (54%)**		

Table 5.6: Descriptive statistics							
Measured variables	**Response %**	**Min.**	**Max.**	**Mean**	**Std. deviation**	**Skewness**	**Kurtosis**
Human intellectual capital							
HC1: Our employees are highly skilled	99.82%	1	7	4.670	1.292	-0.212	-0.530
HC2: Our employees are experts at their jobs	100.00%	2	7	4.800	1.243	-0.186	-0.612
HC3: Our employees are innovative in generating new ideas	100.00%	1	7	4.740	1.224	-0.060	-0.592
HC4: Our employees are able to focus on the quality of service/products provided	99.91%	1	7	4.850	1.244	-0.149	-0.621
HC5: Our employees are sharing their knowledge with other colleagues /team members	99.82%	1	7	4.880	1.260	-0.266	-0.408
HC6: Our employees are committed to their work	99.82%	1	7	4.960	1.283	-0.265	-0.603
HC7: Our employees are loyal to the firm	100.00%	1	7	4.940	1.231	-0.230	-0.470
HC8: Our employees are sufficiently educated for the job they are performing	99.91%	1	7	4.890	1.256	-0.251	-0.468
HC9: Our employees are highly motivated	100.00%	1	7	4.780	1.267	-0.285	-0.364
HC10: Our employees are capable of applying time management	100.00%	1	7	4.730	1.296	-0.146	-0.578
HC11: Our employees are capable of utilizing resources effectively	100.00%	1	7	4.770	1.334	-0.234	-0.582
HC12: Our employees are highly productive	99.82%	2	7	5.000	1.192	-0.304	-0.448
Structural intellectual capital							
SC1: Our brands, patents, trademarks and licenses represent what our firm stands for.	99.03%	1	7	4.940	1.274	-0.297	-0.406

Continue table 5.6: Descriptive statistics							
Measured variables	**Response %**	**Min.**	**Max.**	**Mean**	**Std. deviation**	**Skewness**	**Kurtosis**
Structural intellectual capital							
SC2: Our brands, patents, trademarks, copyrights and licenses are legally protected.	98.86%	1	7	4.970	1.338	-0.184	-0.757
SC3: There are adequate manuals/policies and procedures in place to describe routine activities.	100.00%	1	7	4.980	1.278	-0.250	-0.567
SC4: There are databases in place to manage firm activities.	99.91%	1	7	4.980	1.302	-0.226	-0.599
SC5: There is a job description in place for all types of jobs performed in the firm.	100.00%	1	7	4.990	1.308	-0.282	-0.630
SC6: Innovation in all firm aspects is given high importance.	100.00%	1	7	4.760	1.339	-0.264	-0.485
SC7: Our firm's culture represents our ways of doing business.	100.00%	1	7	4.910	1.251	-0.215	-0.547
SC8: Our firm has protection systems against knowledge loss.	99.65%	1	7	4.840	1.358	-0.239	-0.670
SC9: Our firm's organizational structure represents different responsibilities and communication levels.	100.00%	1	7	4.900	1.282	**-0.330**	-0.483
SC10: There is a quality assurance system in place.	99.91%	1	7	4.890	1.368	-0.210	-0.689
SC11: There is a time utilization monitoring system in place.	99.91%	1	7	4.860	1.289	-0.239	-0.491
SC12: There is a resource utilization monitoring system in place.	100.00%	1	7	4.850	1.302	-0.259	-0.605

Continue table 5.6: Descriptive statistics							
Measured variables	**Response %**	**Min.**	**Max.**	**Mean**	**Std. deviation**	**Skewness**	**Kurtosis**
Relational intellectual capital							
RC1: Our customers are satisfied with our products and services.	99.39%	2	7	4.840	1.211	-0.168	-0.504
RC2: Our customers are loyal.	99.21%	1	7	4.890	1.258	-0.169	-0.624
RC3: Our customer complaints are always considered in any product/service development.	98.86%	1	7	5.000	1.291	-0.266	-0.607
RC4: Our target is to have continuous business with our customers.	99.65%	2	7	5.070	1.305	-0.226	-0.747
RC5: There are clear market segments and customer profiles in place.	99.21%	1	7	4.970	1.250	-0.212	-0.578
RC6: We have good relationships with customers.	99.65%	2	7	4.970	1.310	**-0.301**	-0.611
RC7: We have good relationships with suppliers.	99.65%	1	7	4.980	1.235	-0.170	-0.589
RC8: We have good relationships with investors.	99.12%	1	7	4.990	1.305	-0.292	-0.594
RC9: We have good relationships with creditors.	99.03%	2	7	4.990	1.265	-0.258	-0.582
RC10: Our brands are well known.	99.39%	2	7	5.100	1.346	-0.272	-0.694
RC11: Our firm has a good reputation.	99.82%	1	7	5.090	1.285	-0.291	-0.599
RC12: Our market share is acceptable compared to our competitors.	99.30%	1	7	5.130	1.290	**-0.324**	-0.535
Competitive advantage							
CA1: We have better employee's quality compared to competitors.	99.91%	2	7	5.100	1.192	-0.291	-0.424
CA2: Our firm has better managerial capabilities compared to competitors.	99.82%	2	7	5.090	1.160	-0.282	-0.384

Continue table 5.6: Descriptive statistics							
Measured variables	**Response %**	**Min.**	**Max.**	**Mean**	**Std. deviation**	**Skewness**	**Kurtosis**
Firm performance							
FP5: Overall financial performance	99.03%	2	7	5.250	1.060	**-0.401**	0.271
FP6: Capacity utilization	99.82%	2	7	5.030	1.133	-0.176	-0.345
FP7: Customer satisfaction	99.39%	2	7	5.160	1.120	-0.208	-0.404
FP8: Product quality	99.65%	2	7	5.250	1.137	-0.291	-0.447
FP9: Success rate in launching new products	98.51%	2	7	5.290	1.060	**-0.324**	-0.128
FP10: Overall operational performance	99.91%	2	7	5.330	1.056	-0.230	-0.448
BSC implementation extent							
BSCImp1: Both important financial and non-financial performance are measured.	100.00%	1	7	4.650	1.277	-0.292	-0.032
BSCImp2: There are cause-and-effect relationships between financial and non-financial performance measures in use	100.00%	1	7	4.400	1.192	-0.218	0.088
BSCImp3: There is an alignment between the firm's strategies and the performance measures.	100.00%	1	7	4.580	1.260	**-0.383**	0.035
BSCImp4: There are targets set to all performance measures in use.	100.00%	1	7	4.930	1.258	**-0.556**	0.390
BSCImp5: There is a link between the achievement of targets set and the firm's reward system.	100.00%	1	7	4.920	1.314	**-0.561**	0.211
The success in BSC implementation (measures the success in the implementation in the areas listed below)							
BSCSucs1: The measurement of both financial and non-financial performance.	100.00%	1	7	4.810	1.224	**-0.498**	0.480
BSCSucs2: Have cause-and-effect relationships between financial and non-financial performance measures	100.00%	1	7	4.430	1.265	-0.262	-0.152

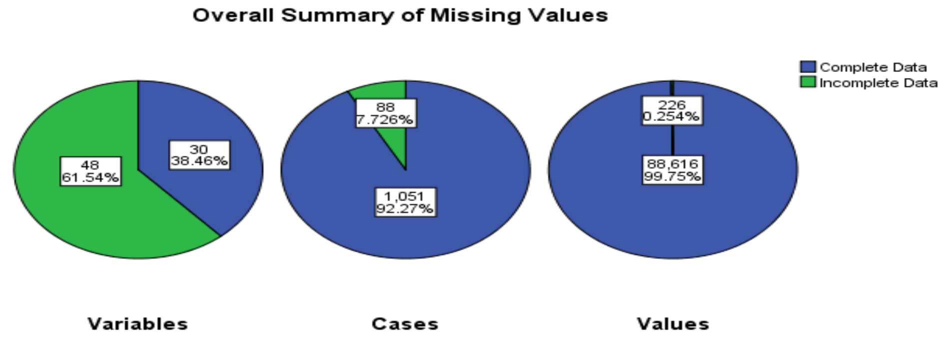
Continue table 5.6: Descriptive statistics							
Measured variables	**Response %**	**Min.**	**Max.**	**Mean**	**Std. deviation**	**Skewness**	**Kurtosis**
The success in BSC implementation (measures the success in the implementation in the areas listed below)							
BSCSucs3: There is alignment between the firm's strategies and the performance measures.	100.00%	1	7	4.790	1.211	**-0.518**	0.449
BSCSucs4: There is target set to every performance measures in use.	100.00%	1	7	4.930	1.258	**-0.575**	0.371
BSCSucs5: There is a link between the achievement of targets set and the firm's reward system	100.00%	1	7	5.180	1.275	**-0.828**	0.825
BSCSucs6: Overall success in the firm's BSC implementation	99.91%	1	7	5.030	1.262	**-0.687**	0.638
The level of firm where BSC is implemented							
BSCL1: At the corporate level only	100.00%	1	7	4.680	1.325	**-0.339**	-0.061
BSCL2: Unit or branch levels	100.00%	1	7	4.680	1.294	**-0.452**	0.248
BSCL3: Department levels	100.00%	1	7	4.440	1.300	**-0.301**	-0.186
BSCL4: Individual employees level	100.00%	1	7	4.270	1.322	**-0.334**	-0.201
Top management support to BSC implementation							
Support	100.00%	1	7	4.750	1.278	**-0.508**	0.208
Involvement	100.00%	1	7	4.750	1.284	**-0.541**	0.327
Linking incentives to BSC implementation							
Incentive link	100.00%	1	7	4.940	1.297	**-0.692**	0.500

Figure 5.1 presents the statistics for missing values in terms of the number of variables and cases that contain missing values, as well as the actual number of missing values. As is shown in the figure, there are in total only 0.254% missing values. Further analysis reveals that the missing values were from 7.7% of the cases, i.e. 88 out of the 1,139 responses, and 30 of the 78 measured variables contain some missing values. The rules implies that missing value of 5% or less considered acceptable, therefore, the percentage of missing values of 0.254% is considered acceptable for conducting multi-variant regression analysis (Tabachnick and Fidell, 2007, Hair et al., 2010). However, for PLS-SEM, it is important to exclude or replace missing values. The data need to be checked for pattern of missing values before a decision on to delete or replace the values can be made.

To check the pattern of missing data, Little's MCAR test is applied (Little, 1988). The test resulted in chi-square of 159.044 and p-value of 0.253, suggesting that the missing values are completely at random. The most common methods suggested in this case are either deleting the case with missing values or replace them with the mean value of the variable (Roth, 1994, Hair et al., 1998). According to Hair et al. (2010) and considering the size of the sample and low percentage of missing data, this study replaces the missing values using the mean substitution method (see Section 4.6.5.3 in the Research Methodology chapter for more details) in order to keep the collected data at the maximum possible.

The study also conducted robustness test in order to check if there is any difference in the results when all cases with missing values are deleted rather than replaced with the mean value. This resulted in 88 cases with missing values being deleted. The path coefficients for all the proposed relationship within the three research frameworks, as presented in Table A.3.1in the appendix, are consistent with the results presented in Table 6.6 in Chapter 6. This shows that the results are robust even when the missing values were replaced with the mean value of the variable.

Figure 5.1: Missing value analysis



5.6.2 Univariate and multivariate outliers

This section analyses the existence of univariate and multivariate outliers. The definitions and rules of thumb of these tests are discussed in section 4.6.5.4 of the Research Methodology chapter. Standardised values (i.e. z scores) that have absolute values greater than 3.29 can be considered as outliers (Tinsley and Brown, 2000). Table 5.7 provides a summary of the univariate outlier cases by measured variable. It shows that 24 of the 78 measured variables analysed have z scores less than -3.29 or greater than 3.29, suggesting the presence of univariate outliers. A total of 56 univariate outliers are identified (a breakdown of the outlier cases by variable is provided in Table 5.7). All univariate outliers are deleted from the dataset.

Table 5.7 : Univariate outlier cases

Measured variable	Cases No.	Measured variable	Cases No.
CA1	**215**, 1099	**CA13**	**215**, 226, 532, 535, 649
CA2	**215**, 535	**CA14**	45, **215**, 403, 535, 544, 649, 929
CA3	**215**, 535	**FP1**	**215**
CA4	53, **215**, 535, 937	**FP2**	**215**
CA5	**215**	**FP3**	**215**, 619
CA6	**215**	**FP4**	**215**, 428, 532, 619, 806
CA7	**215**, 535	**FP5**	53, **215**, 428, 806, 937
CA8	**215**, 651, 1099	**FP6**	**215**, 532
CA9	479	**FP7**	**215**
CA10	479, 544	**FP8**	**215**
CA11	**215**, 535	**FP9**	**215**, 417
CA12	**215**	**FP10**	**215**

However, number 215 occurred 22 times as an outlier among the 24 variables (see Table 5.8). Thus, case number 215 is excluded from the dataset and will not be used for further data analysis. This reduces the number of cases included in the analysis of this study to n=1138.

Table 5.8: Frequency of univariate outlier occurrence in different cases	
Case No.	**Number of times the case Occur**
215	22 times
535	7 times
53	3 times
428, 806, 937, 619, 544, 649, 479 and 1099	2 times

Note: Case number 215 is considered an extreme outlier

Multivariate outlier is the unusual combination of all the variables under study. The most common test to identify multivariate outliers is the Mahalanobis distance (D^2). It is known as a measure of the distance between a point in the data and the distribution of the data (Mahalanobis, 1936). According to Hair (2010), if D^2/df is more than 2.5 for a small sample and 4 for a large sample, then that value is considered a multivariate outlier. This study is considered to have a large sample, with a sample size of n=1,139. Thus, a case with D^2/df value greater than 4 is considered as an outlier. Table 5.9 shows the calculation of D^2/df for all cases with D^2/df value greater than 2.5. As can be seen, the only case with a value of D^2/df greater than 4 is case number 534, which is thus excluded from this study. Given the exclusion of cases 215 (due to univariate outlier problem) and 534 (due to multivariate outlier problem), the final number of cases included in this study is n=1,137.

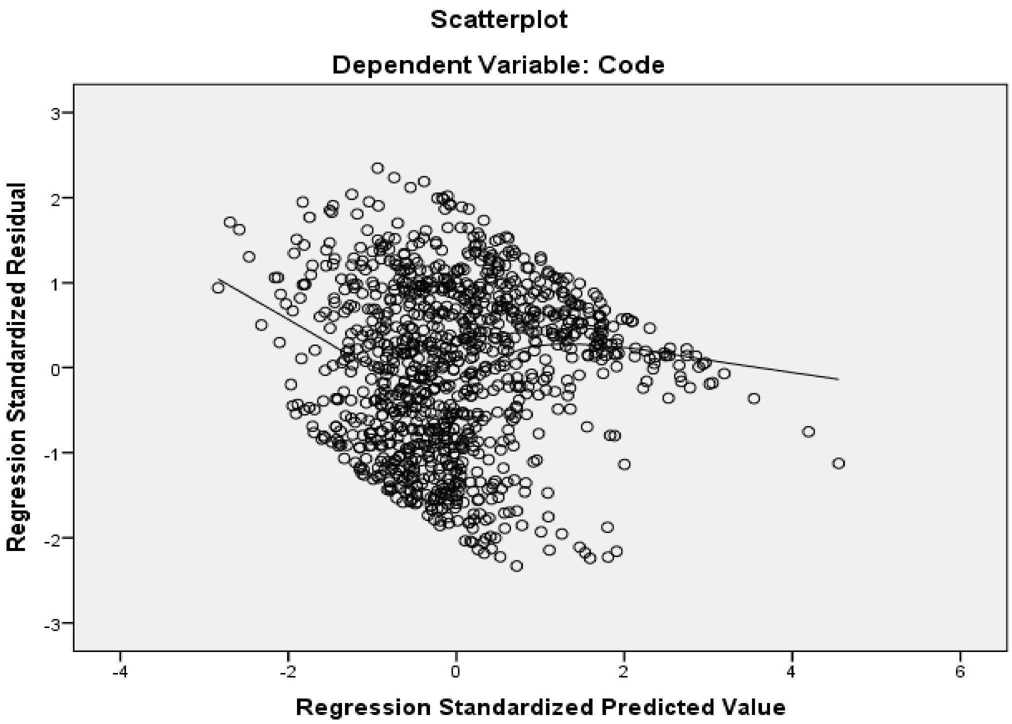
Table 5.9: Mahalanobis Distance test for multivariate outlier			
Mahalanobis distance D^2	**The Degree of Freedom df**	**D^2/df**	**Cases No.**
354.22399	**78**	**4.54**	**534**
265.23112	78	3.4	1110
260.42195	78	3.34	247
250.06761	78	3.21	1131
222.70292	78	2.86	652
221.85753	78	2.84	816
213.47384	78	2.74	477
210.02877	78	2.69	271
208.77523	78	2.68	363
200.41324	78	2.57	559
198.69078	78	2.55	650
196.0974	78	2.51	568

Note: Case number 534 is considered a multivariate outlier

5.6.4 Homoscedasticity test

This study applies both graphical analysis and Levene's test of homogeneity in the variable variances. The scatter plot presented in Figure 5.2 below shows that the homoscedasticity assumption is not violated. Tabachnick and Fidell (2007) suggest that the homoscedasticity assumes that the residuals and their variances should be the same for forecasted scores. The scatter plot shows that all the plotted values approximately take a rectangular shape and the scores are distributed around the point of (0,0). The scatter plot does not show any systematic pattern or clustering of scores. These suggest that the assumption of homoscedasticity is met. Moreover, the results presented in Table 5.8 indicate that Levene's test is insignificant, as the statistical significance of the measured variables are all greater than 0.05, suggesting that the variances are not significantly different. Therefore, the assumption of homogeneity of variance is not violated.

Figure 5.2: Graphical homoscedasticity test



[redacted]

Table 5.10: Test of homogeneity of variances					
Measured variable	**Levene statistic**	**p-value**	**Measured variable**	**Levene statistic**	**p-value**
HC1	1.599	0.206	CA4	2.075	0.150
HC2	0.304	0.582	CA5	0.002	0.962
HC3	2.842	0.092	CA6	1.019	0.313
HC4	0.188	0.664	CA7	0.175	0.676
HC5	0.584	0.445	CA8	4.743	0.070
HC6	1.056	0.304	CA9	1.548	0.214
HC7	2.916	0.088	CA10	0.113	0.737
HC8	0.116	0.733	CA11	0.027	0.871
HC9	0.132	0.716	CA12	0.380	0.538
HC10	0.695	0.405	CA13	1.501	0.221
HC11	0.207	0.649	CA14	0.576	0.448
HC12	0.016	0.900	FP1	0.217	0.641
SC1	0.018	0.892	FP2	0.017	0.895
SC2	0.277	0.599	FP3	0.650	0.420
SC3	1.042	0.307	FP4	0.143	0.706
SC4	0.496	0.482	FP5	0.029	0.864
SC5	0.607	0.436	FP6	0.006	0.937
SC6	0.002	0.960	FP7	0.017	0.897
SC7	0.024	0.878	FP8	0.000	0.997
SC8	0.800	0.371	FP9	0.160	0.689
SC9	0.560	0.454	FP10	0.281	0.596
SC10	2.318	0.128	BSCL1	0.021	0.884
SC11	0.120	0.729	BSCL2	0.008	0.927
SC12	3.109	0.078	BSCL3	1.819	0.178
RC1	0.912	0.340	BSCL4	4.150	0.052
RC2	0.001	0.969	Incentive link	0.491	0.484
RC3	0.267	0.605	BSCImp1	0.001	0.977
RC4	4.767	0.059	BSCImp2	0.062	0.804
RC5	0.081	0.777	BSCImp3	0.132	0.716
RC6	0.088	0.767	BSCImp4	2.960	0.086
RC7	0.036	0.849	BSCImp5	0.029	0.864
RC8	0.564	0.453	Support	0.323	0.570
RC9	0.121	0.728	Involvement	0.459	0.498
RC10	6.767	0.059	BSCSucs1	0.237	0.626
RC11	1.687	0.194	BSCSucs2	1.365	0.243
RC12	1.866	0.172	BSCSucs3	0.198	0.657
CA1	0.383	0.536	BSCSucs4	0.133	0.716
CA2	0.430	0.512	BSCSucs5	3.463	0.063
CA3	0.067	0.796	BSCSucs6	1.082	0.298

5.6.6 Sample size

Sample size is an important issue for any SEM application, as it affects the accuracy of the statistical estimates. Whilst sample size is a critical issue in SEM, until now there is no agreement in the literature about the appropriate or best sample size for SEMs. Kline (2015) argues that ;'there is no simple rule of thumb about sample size that works across all studies' (Kline, 2015, p 15). Therefore, prior studies suggested rules for the minimum sample size which is dependent on the number of indicators (measured variables) included in the SEM. For example, Hoyle and Kenny (1999) and Marsh and Hau (1999) argue that simple SEMs can be meaningful even with small sample sizes. For exploratory factor analysis, Gorsuch (1990) suggests the availability of five cases for each measured variable, and the total of cases should not be less than 100. Others recommend a minimum number of between 100 and 150 cases (Landis et al., 2000, Tabachnick and Fidell, 2007), and a sample size between 100 to 200 for both exploratory factor analysis and SEM (Loehlin, 2004, Kline, 2005). Moreover, Kline (2005) suggests a cases/parameter ratio of 5:1. Kline (2015) reviews all suggestions and proposes four main rules to decide on sample size, which are (1) the complexity of the model, as models with more parameters (constructs, indicators and relations) require bigger sample and vice versa, (2) continuous and normal data distribution, all effects are linear, and without interaction effect require small sample and vice versa, (3) low score reliability requires large sample to offset the potential effect of measurement error and vice versa, and (4) the content of the SEM. Thus, a large sample size is required for the following: (i) few indicators per constructs, (ii) the construct explains unequal proportions of the variances between indicators, (iii) some indicators relate to different constructs at the same time, (iv) the model has many constructs, and (v) there is low covariance between constructs. However, despite of all the above, this study follows the widely accepted and the most strict rule of thumb for sample size, which is 10 cases per indicator variable (Nunnally et al., 1967). This is to ensure that the maximum requirement is met.

The sample size for this study is n = 1,137 with 78 measured variables, which meets the maximum sampling requirement. Further this research is divided into three frameworks and the number of measured variables involved in each model differs from one to another, with 78 being the maximum. Table 5.11 describes the sample size requirement for each of the three frameworks. As can be seen, the sample size for this study is considered sufficient for confirmatory factor analysis and SEM in line with the recommended sample size by Nunnally et al. (1967).

Table: 5.11: Sample size requirements			
Framework	**Number of measured variables**	**Number of cases required**	**Number of cases available**
1	HC = 12 CA = 14 RC = 12 FP = 10 SC = 12 Total = 60 Variables	60 Measured variables * 10 cases = 600 cases	1,137 cases
2	HC =12 CA = 14 SC = 12 FP = 10 RC = 12 BSCImpl = 5 Total = 65 variables	65 measured variables * 10 cases = 650 cases	1,137 cases
3	HC = 12 BSCImpl = 5 SC = 12 BSCLevel = 4 RC = 12 BSCSucs = 6 CA = 14 TopMGMT = 2 FP = 10 Incent.Link = 1 Total = 78 variables	78 Measured variables * 10 cases = 780 cases	1,137 cases

5.7 Chapter summary

This chapter provides a detailed explanation and description of the nature of the data collected using a questionnaire survey. It begins by providing a brief description of how each question was answered and provides some statistical analyses for the data distribution. After that the data was screened and evaluated to test their suitability for SEM. To this end, the data were screened for missing values and outliers, and were treated accordingly. Further, the data is tested for normality, homoscedasticity, variances and suitability of sample size. Most of the tests show that the data collected in this study is suitable for SEM. The only issue with the data is data normality, which is considered to be a big issue for CB-SEM, though not an issue with PLS-SEM used in this study.

Overall, the descriptive data analysis conclude the data collected met the requirements of PLS-SEM. Next chapter, will discuss the data analysis stages for both measurement and structural model evaluation using applying PLS-SEM using Smart-PLS 3 software.

CHAPTER SIX: QUANTITATIVE DATA ANALYSIS

6.1 Introduction

The previous chapter provided descriptive analysis of the data collected using a questionnaire survey. It also investigated the suitability of the data collected for PLS-SEM. Tests for non-response bias, missing data, univariate and multivariate outliers, homoscedasticity and sample size requirement were conducted. Another test that is required is the multi-collinearity test, which will be conducted as part of the measurement model analysis in this chapter. The analysis given in the previous chapter provides evidence that the data collected via the questionnaire survey have been thoroughly screened for missing values, outliers and testing data for homoscedasticity and multi-collinearity problems and meet the requirements of PLS-SEM as discussed in the Research Methodology Chapter.

This chapter aims to evaluate the measurement and structural models for each of the proposed research frameworks separately. It will also provide a robustness test section for the three research framework using secondary data for measuring firm performance. This analysis was applied to listed firms only due to the limited availability of financial reports for non-listed firms.

The measurement model evaluation involves two steps, namely multi-collinearity of indicators and outer weight assessment. This research applies a multi-collinearity test between latent variables, path coefficient β and coefficient of determination R^2 for the structural model evaluation. After examining the model fit and hypotheses support, analysis on the mediating effects is provided. This is then followed by the investigation of the impact of firm size and age on the relationships proposed in the three research frameworks.

6.2 Structural equation modelling (SEM)

The structural equation modelling in this chapter is based on construct classification given in Table 4.4 in section 4.6.3 of the methodology chapter, all of the constructs used by the three research frameworks are formative rather than reflective, and thus the EFA test is not required for these research constructs. The CFA examines the relationships between indicators and latent variables which represent observed and unobserved measures. The structural model is the second phase of SEM and it is used to test relationships between dependent and independent variables for hypotheses testing purposes. The structural model is also referred to as path analysis (Hair et al., 1998). For this study, the CFA and the structural model are performed using SmartPLS version 3. The measurement and structural model analysis and discussion for each one of the three frameworks discussed previously in literature and methodology chapter will be discussed thoroughly in this chapter.

6.2.1 Measurement model evaluation

CFA is a statistical tool used to identify the factor structure of a set of observed items (indicators) in order to prove the presence of a relationship between the indicators and their measured latent variable (construct). Afthanorhan et al. (2014) argue that CFA is a tool to measure the fitness of the measurement model, as it prevents wrong estimation when predicting the strength, significance, importance and the purpose of the measured variables. CFA can be implemented by verifying the reliability and the validity of the measurement model (Gudergan et al., 2008, Yi and Gong, 2013). However, as stated in methodology chapter, the validity and reliability of indicators apply only to the reflective measurement model and does not apply to formative model. Coltman et al. (2008,p. 6) argue that *'One of the key operational issues in the use of formative indicators is that no simple, easy and universally accepted criteria exists for assessing the reliability of formative indicators'*. Therefore, and since all this research constructs are formative, the CFA will be conducted using multi-collinearity and outer weight significances commonly recommended by previous research (Jarvis et al., 2003; Coltman et al., 2008; Hair Jr et al., 2016).

However, not all the constructs used in this research are first-order constructs, which means that not all the constructs are measured directly with measured indicators. For example, the IC construct is not measured directly, but it is measured indirectly using human intellectual capital (HC), structural intellectual capital (SC) and relational intellectual capital (RC). The three types of capital are latent variables and each one of them is measured using 12 indicators. In this case the relationship between HC, SC and RC and their indicators is considered the first order analysis of the IC construct and the relationship between the three types of capitals and the IC is the second order. Hair Jr et al.

(2016) advised to conduct the measurement model evaluation separately for the first and the second order. They also suggested applying two stages approach to transform the construct from second order to first order construct (see section 4.6.5 of the methodology chapter). The suggested criterion for measurement model evaluation should be checked at each stage. The two stages of second order construct analysis are discussed in the next section and the measurement model evaluation will be conducted separately for the two stages as suggested by Hair Jr et al. (2016). The modelling for the three frameworks at the two stages of the second order evaluation is presented in tables A.3.1, A.3.2 and A.3.3 of the appendix.

6.2.1.2 Multi-collinearity between indicators

As discussed in the Research Methodology chapter, the multi-collinearity issue between indicators is tested using tolerance and VIF values. The two tests show the correlations between the indicators. The lower the VIF (below 5) and the higher the tolerance (0.2 or above) is the least correlation between indicators. The tests will be conducted separately for the first and the second stage of the second order construct analysis. In the first stage, all of the indicators will be evaluated at the same time. However, the second stage evaluation is limited to evaluating the latent scores of HC, SC and RC separately for each research framework. This is because the latent scores of the three constructs are different for different research frameworks, as the latent score calculation includes the scores of all other constructs included in the framework. Tables 6.1 and 6.2 present the results of VIF and tolerance tests for the first and second stage analysis, respectively. It can be seen from the tables that all VIF values are below 5 and tolerance values above 0.2, which are within the thresholds suggested in Hair (2010), suggesting that multi-collinearity is not a problem in this study. Therefore, the requirement of PLS-SEM application that multi-collinearity is not at a critical level (Hair Jr et al., 2016) is satisfied. After the multi-collinearity test, the next step of the measurement model evaluation is the outer weight significance test, which is conducted in the next section.

Table 6.1: Collinearity test - tolerance and variance inflation factor (VIF) values			
Construct	**Indicator**	**Tolerance**	**VIF**
HC	**HC1**	0.309	3.235
	HC2	0.315	3.171
	HC3	0.329	3.037
	HC4	0.288	3.471
	HC5	0.374	2.672
	HC6	0.473	2.114
	HC7	0.342	2.927
	HC8	0.303	3.301
	HC9	0.376	2.659
	HC10	0.304	3.290
	HC11	0.493	2.030
	HC12	0.339	2.954
RC	**RC1**	0.326	3.065
	RC2	0.263	3.800
	RC3	0.316	3.164
	RC4	0.274	3.648
	RC5	0.379	2.638
	RC6	0.270	3.699
	RC7	0.318	3.147
	RC8	0.587	1.704
	RC9	0.383	2.613
	RC10	0.309	3.234
	RC11	0.337	2.971
	RC12	0.357	2.801
SC	**SC1**	0.309	3.241
	SC2	0.296	3.377
	SC3	0.304	3.286
	SC4	0.263	3.805
	SC5	0.318	3.142
	SC6	0.295	3.389
	SC7	0.357	2.803
	SC8	0.320	3.128
	SC9	0.317	3.159
	SC10	0.355	2.820
	SC11	0.360	2.778
	SC12	0.370	2.703
CA	**CA1**	0.362	2.759
	CA2	0.286	3.495
	CA3	0.378	2.643
	CA4	0.354	2.821
	CA5	0.375	2.664
	CA6	0.310	3.228
	CA7	0.352	2.841

Continue table 6.1: Collinearity test - tolerance and variance inflation factor (VIF) values			
Construct	**Indicator**	**Tolerance**	**VIF**
CA	**CA8**	0.293	3.410
	CA9	0.377	2.656
	CA10	0.418	2.395
	CA11	0.425	2.355
	CA12	0.380	2.635
	CA13	0.434	2.306
	CA14	0.400	2.502
FP	**FP1**	0.321	3.120
	FP2	0.282	3.540
	FP3	0.391	2.559
	FP4	0.325	3.081
	FP5	0.343	2.914
	FP6	0.337	2.966
	FP7	0.339	2.946
	FP8	0.344	2.907
	FP9	0.397	2.518
	FP10	0.279	3.579
BSC implementation extent	**BSCImp1**	0.328	3.046
	BSCImp2	0.299	3.343
	BSCImp3	0.282	3.542
	BSCImp4	0.281	3.556
	BSCImp5	0.394	2.535
Success in BSC Implementation	**BSCSucs1**	0.252	3.976
	BSCSucs2	0.382	2.618
	BSCSucs3	0.335	2.989
	BSCSucs4	0.386	2.592
	BSCSucs5	0.356	2.809
	BSCSucs6	0.307	3.257
BSC Implementation at different levels of the firm	**BSCL1**	0.327	3.055
	BSCL2	0.585	1.709
	BSCL3	0.355	2.813
	BSCL4	0.328	3.046
Management support	**Involvement**	0.641	1.561
	Support	0.641	1.561
Incentive Link	**Incentive Link**	1.000	1.000

Table 6.2: Collinearity test - tolerance and variance inflation factor (VIF) values (second order analysis)			
Construct	**Indicators**	**Tolerance**	**VIF**
First research framework			
IC	**HC LS1**	0.409	2.445
	RC LS1	0.292	3.425
	SC LS1	0.280	3.577
Second research framework			
IC	**HC LS2**	0.320	3.123
	RC LS2	0.691	1.447
	SC LS2	0.314	3.185
Third research framework			
IC	**HC LS3**	0.484	2.064
	RC LS3	0.419	2.385
	SC LS3	0.378	2.649

6.2.1.3 The outer weights

The next step of analysing the factorability of the formative measurement model is to test the significance and relevance of the indicators' weight used to measure each construct within the research framework concerned, i.e. the outer weight significance test. Similar to the tests conducted previously, this test will be conducted separately for each research framework and for each stage of the second order construct evaluation. This is because the outer weight calculation considers all the constructs in the research framework, which are different from one framework to another. The outer weight significance test was discussed in section 4.6.4 of the Research Methodology chapter. In a structural model, the inner refers to inside of the model (i.e. relations between constructs) and outer refers to outside of the model (i.e. relations between indicators and construct) (Hair et al., 2006). Further, in the measurement model, the indicators are considered as outer when the model is formative and they are considered as inner when the model is reflective (Diamantopoulos and Siguaw, 2006). The SmartPLS calculates both the outer weight and loading for a formative model and the inner weight and loading for a reflective model, which indicate the relevance of the indicators for capturing the construct content. Given this study concerns mainly with formative models, outer weight and loading are more relevant as the indicators are considered as outer for such models.

Coltman et al. (2008), Hair et al. (2013) and Hair Jr et al. (2016) stressed the importance of this test in deciding on the suitability of the measurement model for further analysis. If all indicators are found to be relevant and hold significant weight on measuring the proposed construct, it can be concluded that the measured model (construct + indicators) is suitable for structural model evaluation.

In order to calculate p-value, t-value and the significance of the outer weight of the formative indicators, this study used bootstrapping. The bootstrapping tool calculates the bootstrap standard error which is used to estimate t-values. If the outer weight is not significant for any of the indicators, then it is recommended to use outer loading (≥ 0.5) to decide on whether or not to retain an indicator. If the outer loading is less than 0.5, the significance of the loading should then be considered (Hair Jr et al., 2016). Finally, the indicator should be deleted from its construct if none of the above criteria are met. Table 6.3 provides the results for outer weights and loadings as well as their significances for the three research framework proposed in this study in the first order analysis, and Table 6.4 provides the bootstrapping results for the second order analysis.

The results in the two tables suggest that there are many insignificant outer weights presented by each of the three research frameworks. The first-order construct evaluation stage shows that the first, second and third research framework have 14 out of 60, 22 out of 65 and 20 out of 77 insignificant outer weights respectively. The second stage shows that the three research frameworks have 9 out of 27, 10 out of 32 and 11 out of 44 insignificant outer weights respectively. Before deleting any of the indicators with insignificant outer weights, the outer loadings and their significance are considered (Hair Jr et al. (2016). The results show that all outer loadings for the insignificant outer weight indicators found in the three research frameworks are significant with loading values above the threshold of 0.5 suggested in Hair Jr et al. (2016). This suggests the importance of these indicators for contributing to the contents of their constructs and suggests that all of the indicators can be retained for further analysis of the structural models evaluation for the three research frameworks.

Table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
First research framework							
HC	HC1	0.150	0.000	***	0.858	0.000	***
	HC2	0.084	0.007	***	0.826	0.000	***
	HC3	0.096	0.001	***	0.828	0.000	***
	HC4	0.145	0.000	***	0.872	0.000	***
	HC5	0.143	0.000	***	0.828	0.000	***
	HC6	0.096	0.000	***	0.759	0.000	***
	HC7	0.127	0.000	***	0.827	0.000	***
	HC8	0.056	**0.077**	**Insignificant**	**0.841**	0.000	***
	HC9	0.061	0.024	**	0.781	0.000	***
	HC10	0.064	**0.052**	**Insignificant**	**0.844**	0.000	***
	HC11	0.122	0.000	***	0.758	0.000	***
	HC12	0.071	0.006	***	0.817	0.000	***
RC	RC1	0.118	0.000	***	0.842	0.000	***
	RC2	0.170	0.000	***	0.892	0.000	***
	RC3	0.110	0.000	***	0.838	0.000	***
	RC4	0.022	**0.419**	**Insignificant**	**0.838**	0.000	***
	RC5	0.129	0.000	***	0.810	0.000	***
	RC6	0.082	0.005	***	0.865	0.000	***
	RC7	0.114	0.000	***	0.846	0.000	***
	RC8	0.017	**0.340**	**Insignificant**	**0.638**	0.000	***
	RC9	0.076	0.002	***	0.802	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue first research framework							
RC	RC10	0.042	**0.104**	**Insignificant**	**0.827**	0.000	***
	RC11	0.079	0.001	***	0.829	0.000	***
	RC12	0.225	0.000	***	0.865	0.000	***
SC	SC1	0.129	0.000	***	0.832	0.000	***
	SC2	0.093	0.000	***	0.821	0.000	***
	SC3	0.037	**0.137**	**Insignificant**	**0.818**	0.000	***
	SC4	0.145	0.000	***	0.871	0.000	***
	SC5	0.040	**0.116**	**Insignificant**	**0.821**	0.000	***
	SC6	0.170	0.000	***	0.871	0.000	***
	SC7	0.092	0.000	***	0.820	0.000	***
	SC8	0.125	0.000	***	0.852	0.000	***
	SC9	0.068	0.009	***	0.828	0.000	***
	SC10	0.047	**0.072**	**Insignificant**	**0.801**	0.000	***
	SC11	0.138	0.000	***	0.825	0.000	***
	SC12	0.110	0.000	***	0.811	0.000	***
CA	CA1	0.243	0.000	***	0.859	0.000	***
	CA2	0.123	0.000	***	0.865	0.000	***
	CA3	0.069	0.006	**	0.787	0.000	***
	CA4	-0.029	**0.260**	**Insignificant**	**0.749**	0.000	***
	CA5	0.095	0.000	***	0.775	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
CA	CA6	0.082	0.004	***	0.814	0.000	***
	CA7	0.039	**0.181**	**Insignificant**	**0.778**	0.000	***
	CA8	0.108	0.000	***	0.848	0.000	***
	CA9	0.060	0.014	**	0.777	0.000	***
	CA10	0.134	0.000	***	0.780	0.000	***
	CA11	0.010	**0.685**	**Insignificant**	**0.724**	0.000	***
	CA12	0.148	0.000	***	0.815	0.000	***
	CA13	0.097	0.000	***	0.767	0.000	***
	CA14	0.049	**0.077**	**Insignificant**	**0.756**	0.000	***
FP	FP1	0.024	**0.437**	**Insignificant**	**0.789**	0.000	***
	FP2	0.069	0.029	**	0.834	0.000	***
	FP3	0.060	0.027	**	0.780	0.000	***
	FP4	0.101	0.001	***	0.813	0.000	***
	FP5	0.003	**0.908**	**Insignificant**	**0.782**	0.000	***
	FP6	0.207	0.000	***	0.855	0.000	***
	FP7	0.148	0.000	***	0.855	0.000	***
	FP8	0.292	0.000	***	0.889	0.000	***
	FP9	0.113	0.000	***	0.808	0.000	***
	FP10	0.156	0.000	***	0.882	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Second research framework							
HC	HC1	0.151	0.000	***	0.855	0.000	***
	HC2	0.093	0.024	**	0.829	0.000	***
	HC3	0.124	0.001	***	0.838	0.000	***
	HC4	0.138	0.000	***	0.871	0.000	***
	HC5	0.132	0.000	***	0.824	0.000	***
	HC6	0.105	0.000	***	0.762	0.000	***
	HC7	0.102	0.005	***	0.817	0.000	***
	HC8	0.022	**0.531**	**Insignificant**	**0.828**	0.000	***
	HC9	0.054	**0.092**	**Insignificant**	**0.774**	0.000	***
	HC10	0.066	**0.097**	**Insignificant**	**0.844**	0.000	***
	HC11	0.147	0.000	***	0.769	0.000	***
	HC12	0.084	0.007	***	0.819	0.000	***
RC	RC1	0.096	0.001	***	0.827	0.000	***
	RC2	0.165	0.000	***	0.887	0.000	***
	RC3	0.117	0.001	***	0.828	0.000	***
	RC4	0.003	**0.948**	**Insignificant**	**0.824**	0.000	***
	RC5	0.162	0.000	***	0.813	0.000	***
	RC6	0.061	**0.106**	**Insignificant**	**0.854**	0.000	***
	RC7	0.114	0.000	***	0.837	0.000	***
	RC8	0.016	**0.535**	**Insignificant**	**0.634**	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
RC	RC9	0.056	**0.098**	**Insignificant**	**0.786**	0.000	***
	RC10	0.014	**0.679**	**Insignificant**	**0.812**	0.000	***
	RC11	0.049	**0.170**	**Insignificant**	**0.814**	0.000	***
	RC12	0.325	0.000	***	0.892	0.000	***
SC	SC1	0.104	0.000	***	0.825	0.000	***
	SC2	0.109	0.001	***	0.820	0.000	***
	SC3	-0.008	**0.800**	**Insignificant**	**0.804**	0.000	***
	SC4	0.160	0.000	***	0.871	0.000	***
	SC5	0.041	**0.170**	**Insignificant**	**0.821**	0.000	***
	SC6	0.180	0.000	***	0.873	0.000	***
	SC7	0.081	0.003	***	0.817	0.000	***
	SC8	0.161	0.000	***	0.861	0.000	***
	SC9	0.056	**0.112**	**Insignificant**	**0.826**	0.000	***
	SC10	0.062	**0.058**	**Insignificant**	**0.802**	0.000	***
	SC11	0.125	0.000	***	0.820	0.000	***
	SC12	0.122	0.000	***	0.814	0.000	***
CA	CA1	0.228	0.000	***	0.853	0.000	***
	CA2	0.116	0.000	***	0.862	0.000	***
	CA3	0.079	0.002	***	0.791	0.000	***
	CA4	-0.026	**0.315**	**Insignificant**	**0.753**	0.000	***
	CA5	0.089	0.001	***	0.773	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
CA	CA6	0.079	0.009	***	0.813	0.000	***
	CA7	0.036	**0.216**	**Insignificant**	**0.777**	0.000	***
	CA8	0.106	0.000	***	0.848	0.000	***
	CA9	0.070	0.005	***	0.781	0.000	***
	CA10	0.131	0.000	***	0.781	0.000	***
	CA11	0.013	**0.579**	**Insignificant**	**0.728**	0.000	***
	CA12	0.155	0.000	***	0.819	0.000	***
	CA13	0.101	0.000	***	0.770	0.000	***
	CA14	0.054	0.040	**	0.760	0.000	***
FP	FP1	0.029	**0.304**	**Insignificant**	**0.794**	0.000	***
	FP2	0.088	0.003	***	0.841	0.000	***
	FP3	0.049	**0.064**	**Insignificant**	**0.779**	0.000	***
	FP4	0.118	0.000	***	0.821	0.000	***
	FP5	0.004	**0.897**	**Insignificant**	**0.786**	0.000	***
	FP6	0.192	0.000	***	0.852	0.000	***
	FP7	0.136	0.000	***	0.850	0.000	***
	FP8	0.266	0.000	***	0.883	0.000	***
	FP9	0.137	0.000	***	0.817	0.000	***
	FP10	0.156	0.000	***	0.883	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
BSC implementation Extent	BSCImp1	0.101	**0.157**	**Insignificant**	0.838	0.000	***
	BSCImp2	0.643	0.000	***	0.973	0.000	***
	BSCImp3	0.292	0.000	***	0.887	0.000	***
	BSCImp4	0.065	**0.414**	**Insignificant**	0.830	0.000	***
	BSCImp5	-0.033	**0.609**	**Insignificant**	0.703	0.000	***
Third research framework							
HC	HC1	0.147	0.000	***	0.854	0.000	***
	HC2	0.093	0.021	**	0.829	0.000	***
	HC3	0.125	0.000	***	0.839	0.000	***
	HC4	0.139	0.001	***	0.871	0.000	***
	HC5	0.133	0.000	***	0.825	0.000	***
	HC6	0.102	0.000	***	0.761	0.000	***
	HC7	0.102	0.007	***	0.817	0.000	***
	HC8	0.022	**0.517**	**Insignificant**	**0.828**	0.000	***
	HC9	0.056	**0.088**	**Insignificant**	**0.775**	0.000	***
	HC10	0.065	**0.093**	**Insignificant**	**0.844**	0.000	***
	HC11	0.147	0.000	***	0.769	0.000	***
	HC12	0.086	0.009	***	0.820	0.000	***
RC	RC1	0.095	0.002	***	0.826	0.000	***
	RC2	0.169	0.000	***	0.888	0.000	***
	RC3	0.117	0.001	***	0.828	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
RC	RC4	0.001	**0.986**	**Insignificant**	**0.823**	0.000	***
	RC5	0.163	0.000	***	0.813	0.000	***
	RC6	0.063	**0.088**	**Insignificant**	**0.855**	0.000	***
	RC7	0.112	0.000	***	0.836	0.000	***
	RC8	0.017	**0.460**	**Insignificant**	**0.634**	0.000	***
	RC9	0.056	**0.122**	**Insignificant**	**0.786**	0.000	***
	RC10	0.012	**0.712**	**Insignificant**	**0.811**	0.000	***
	RC11	0.047	**0.162**	**Insignificant**	**0.813**	0.000	***
	RC12	0.327	0.000	***	0.892	0.000	***
SC	SC1	0.102	0.001	***	0.824	0.000	***
	SC2	0.109	0.001	***	0.820	0.000	***
	SC3	-0.009	**0.768**	**Insignificant**	**0.804**	0.000	***
	SC4	0.160	0.000	***	0.871	0.000	***
	SC5	0.039	**0.223**	**Insignificant**	**0.821**	0.000	***
	SC6	0.179	0.000	***	0.872	0.000	***
	SC7	0.081	0.003	***	0.817	0.000	***
	SC8	0.159	0.000	***	0.860	0.000	***
	SC9	0.056	**0.110**	**Insignificant**	**0.825**	0.000	***
	SC10	0.063	0.039	**	0.802	0.000	***
	SC11	0.127	0.000	***	0.821	0.000	***
	SC12	0.126	0.000	***	0.816	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
CA	CA1	0.222	0.000	***	0.851	0.000	***
	CA2	0.116	0.000	***	0.862	0.000	***
	CA3	0.077	0.001	***	0.791	0.000	***
	CA4	-0.025	**0.378**	**Insignificant**	**0.754**	0.000	***
	CA5	0.091	0.000	***	0.775	0.000	***
	CA6	0.081	0.005	***	0.815	0.000	***
	CA7	0.038	**0.167**	**Insignificant**	**0.778**	0.000	***
	CA8	0.102	0.000	***	0.848	0.000	***
	CA9	0.073	0.002	***	0.782	0.000	***
	CA10	0.130	0.000	***	0.781	0.000	***
	CA11	0.016	**0.522**	**Insignificant**	**0.729**	0.000	***
	CA12	0.153	0.000	***	0.819	0.000	***
	CA13	0.101	0.000	***	0.771	0.000	***
	CA14	0.055	0.031	**	0.762	0.000	***
FP	FP1	0.031	**0.273**	**Insignificant**	**0.796**	0.000	***
	FP2	0.094	0.001	***	0.842	0.000	***
	FP3	0.042	**0.115**	**Insignificant**	**0.777**	0.000	***
	FP3	0.042	**0.115**	**Insignificant**	**0.777**	0.000	***
	FP4	0.117	0.000	***	0.820	0.000	***
	FP5	0.008	**0.794**	**Insignificant**	**0.787**	0.000	***
	FP6	0.191	0.000	***	0.852	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.3: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
	FP7	0.137	0.000	***	0.851	0.000	***
	FP8	0.263	0.000	***	0.882	0.000	***
	FP9	0.138	0.000	***	0.817	0.000	***
	FP10	0.156	0.000	***	0.883	0.000	***
BSC Implementation Extent	BSCImp1	0.118	0.015	**	0.851	0.000	***
	BSCImp2	0.556	0.000	***	0.962	0.000	***
	BSCImp3	0.241	0.000	***	0.892	0.000	***
	BSCImp4	0.126	0.019	******	0.862	0.000	***
	BSCImp5	0.054	**0.272**	**Insignificant**	**0.754**	0.000	***
BSC Implementation at different levels	BSCL1	0.325	0.000	***	0.912	0.000	***
	BSCL2	0.222	0.000	***	0.754	0.000	***
	BSCL3	0.291	0.000	***	0.881	0.000	***
	BSCL4	0.308	0.000	***	0.906	0.000	***
BSC Implementation Success	BSCSucs1	0.398	0.000	***	0.942	0.000	***
	BSCSucs2	0.360	0.000	***	0.903	0.000	***
	BSCSucs3	0.104	0.010	***	0.841	0.000	***
	BSCSucs4	0.103	0.008	***	0.805	0.000	***
	BSCSucs5	0.082	0.047	******	0.803	0.000	***
	BSCSucs6	0.077	**0.077**	**Insignificant**	**0.826**	0.000	***
Top MGMT Support	Involvement	0.733	0.000	***	0.955	0.000	***
	Support	0.371	0.000	***	0.810	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Table 6.4: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-Value**	**Significance**	**Loading**	**p-Value**	**Significance**
First research framework							
IC	HC LS1	0.067	**0.087**	**Insignificant**	**0.788**	0.000	***
	RC LS1	0.681	0.000	***	0.981	0.000	***
	SC LS1	0.305	0.000	***	0.915	0.000	***
CA	CA1	0.252	0.000	***	0.861	0.000	***
	CA2	0.118	0.000	***	0.862	0.000	***
	CA3	0.049	**0.055**	**Insignificant**	**0.775**	0.000	***
	CA4	-0.046	**0.094**	**Insignificant**	**0.741**	0.000	***
	CA5	0.110	0.000	***	0.778	0.000	***
	CA6	0.090	0.002	***	0.815	0.000	***
	CA7	0.042	**0.130**	**Insignificant**	**0.776**	0.000	***
	CA8	0.108	0.001	***	0.847	0.000	***
	CA9	0.069	0.009	***	0.778	0.000	***
	CA10	0.131	0.000	***	0.776	0.000	***
	CA11	-0.011	**0.657**	**Insignificant**	**0.713**	0.000	***
	CA12	0.168	0.000	***	0.819	0.000	***
	CA13	0.093	0.000	***	0.764	0.000	***
	CA14	0.050	**0.068**	**Insignificant**	**0.753**	0.000	***
FP	FP1	0.035	**0.230**	**Insignificant**	**0.793**	0.000	***
	FP2	0.068	0.023	**	0.834	0.000	***
	FP3	0.041	**0.128**	**Insignificant**	**0.775**	0.000	***
	FP4	0.114	0.000	***	0.817	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.4: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-Value**	**Significance**	**Loading**	**p-Value**	**Significance**
Continue first research framework							
FP	FP5	0.003	**0.912**	**Insignificant**	**0.784**	0.000	***
	FP6	0.196	0.000	***	0.852	0.000	***
	FP7	0.145	0.000	***	0.853	0.000	***
	FP8	0.277	0.000	***	0.886	0.000	***
	FP9	0.135	0.000	***	0.816	0.000	***
	FP10	0.160	0.000	***	0.884	0.000	***
Second research framework							
IC	HC LS2	0.714	0.000	***	0.979	0.000	***
	RC LS2	0.154	0.000	***	0.648	0.000	***
	SC LS2	0.225	0.000	***	0.892	0.000	***
CA	CA1	0.230	0.000	***	0.853	0.000	***
	CA2	0.108	0.000	***	0.860	0.000	***
	CA3	0.082	0.002	***	0.794	0.000	***
	CA4	-0.021	**0.445**	**Insignificant**	**0.753**	0.000	***
	CA5	0.086	0.001	***	0.771	0.000	***
	CA6	0.073	0.011	**	0.811	0.000	***
	CA7	0.043	**0.122**	**Insignificant**	**0.780**	0.000	***
	CA8	0.105	0.001	***	0.848	0.000	***
	CA9	0.072	0.007	***	0.783	0.000	***
	CA10	0.147	0.000	***	0.790	0.000	***
	CA11	0.025	**0.351**	**Insignificant**	**0.732**	0.000	***
	CA12	0.139	0.000	***	0.813	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.4: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-Value**	**Significance**	**Loading**	**p-Value**	**Significance**
Continue second research framework							
CA	CA13	0.102	0.000	***	0.769	0.000	***
	CA14	0.040	**0.160**	**Insignificant**	**0.754**	0.000	***
FP	FP1	0.033	**0.256**	**Insignificant**	**0.797**	0.000	***
	FP2	0.086	0.004	***	0.840	0.000	***
	FP3	0.041	**0.136**	**Insignificant**	**0.778**	0.000	***
	FP4	0.128	0.000	***	0.823	0.000	***
	FP5	0.004	**0.890**	**Insignificant**	**0.786**	0.000	***
	FP6	0.196	0.000	***	0.854	0.000	***
	FP7	0.145	0.000	***	0.852	0.000	***
	FP8	0.254	0.000	***	0.880	0.000	***
	FP9	0.147	0.000	***	0.820	0.000	***
	FP10	0.144	0.000	***	0.881	0.000	***
BSC Implementation extent	BSCImp1	0.113	**0.109**	**Insignificant**	**0.843**	0.000	***
	BSCImp2	0.633	0.000	***	0.972	0.000	***
	BSCImp3	0.273	0.000	***	0.886	0.000	***
	BSCImp4	0.065	**0.411**	**Insignificant**	**0.834**	0.000	***
	BSCImp5	-0.010	**0.884**	**Insignificant**	**0.714**	0.000	***
Third research Framework							
IC	HC LS3	0.017	**0.589**	**Insignificant**	**0.711**	0.000	***
	RC LS3	0.115	0.002	***	0.790	0.000	***
	SC LS3	0.900	0.000	***	0.997	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.4: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-Value**	**Significance**	**Loading**	**p-Value**	**Significance**
Continue third research Framework							
CA	CA1	0.221	0.000	***	0.850	0.000	***
	CA2	0.113	0.000	***	0.861	0.000	***
	CA3	0.080	0.001	***	0.793	0.000	***
	CA4	-0.018	**0.490**	**Insignificant**	**0.755**	0.000	***
	CA5	0.086	0.000	***	0.771	0.000	***
	CA6	0.071	0.031	**	0.810	0.000	***
	CA7	0.035	**0.238**	**Insignificant**	**0.776**	0.000	***
	CA8	0.106	0.001	***	0.848	0.000	***
	CA9	0.072	0.004	***	0.786	0.000	***
	CA10	0.155	0.000	***	0.792	0.000	***
	CA11	0.008	**0.761**	**Insignificant**	**0.725**	0.000	***
	CA12	0.147	0.000	***	0.815	0.000	***
	CA13	0.099	0.000	***	0.770	0.000	***
	CA14	0.057	0.027	**	0.761	0.000	***
FP	FP1	0.027	**0.337**	**Insignificant**	**0.795**	0.000	***
	FP2	0.091	0.002	***	0.841	0.000	***
	FP3	0.038	**0.148**	**Insignificant**	**0.776**	0.000	***
	FP4	0.124	0.000	***	0.822	0.000	***
	FP5	0.008	**0.812**	**Insignificant**	**0.788**	0.000	***
	FP6	0.201	0.000	***	0.855	0.000	***

Note: 1. ** p<0.05, *** p<0.01 2. Bolded texts in the columns for significance indicate insignificant outer weight values

Continue table 6.4: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-Value**	**Significance**	**Loading**	**p-Value**	**Significance**
Continue third research Framework							
FP	FP7	0.129	0.000	***	0.847	0.000	***
	FP8	0.261	0.000	***	0.881	0.000	***
	FP9	0.141	0.000	***	0.817	0.000	***
	FP10	0.157	0.000	***	0.884	0.000	***
BSC Implementation extent	BSCImp1	0.113	0.023	**	0.850	0.000	***
	BSCImp2	0.563	0.000	***	0.963	0.000	***
	BSCImp3	0.242	0.000	***	0.892	0.000	***
	BSCImp4	0.115	0.024	**	0.860	0.000	***
	BSCImp5	0.064	**0.161**	**Insignificant**	**0.756**	0.000	***
BSC Implementation at different levels	BSCL1	0.554	0.000	***	0.955	0.000	***
	BSCL2	0.023	**0.532**	**Insignificant**	**0.653**	0.000	***
	BSCL3	0.165	0.000	***	0.855	0.000	***
	BSCL4	0.348	0.000	***	0.905	0.000	***
BSC Implementation Success	BSCSucs1	0.398	0.000	***	0.942	0.000	***
	BSCSucs2	0.361	0.000	***	0.904	0.000	***
	BSCSucs3	0.103	0.011	**	0.841	0.000	***
	BSCSucs4	0.102	0.009	***	0.804	0.000	***
	BSCSucs5	0.080	**0.063**	**Insignificant**	**0.803**	0.000	***
	BSCSucs6	0.080	**0.075**	**Insignificant**	**0.827**	0.000	***
Top MGMT Support	Involvement	0.733	0.000	***	0.955	0.000	***
	Support	0.370	0.000	***	0.810	0.000	***

Note: 1. ** $p<0.05$, *** $p<0.01$ 2. Bolded texts in the columns for significance indicate insignificant outer weight values

6.2.2 Structural model evaluation

As discussed in the Research Methodology chapter, this study applies PLS-SEM given that all the measurement models are classified as formative models, which are difficult to be analysed using CB-SEM. In addition, the use of PLS-SEM does not require the data to be normally distributed. Further, the complexity of the research frameworks that involve the use of up to 14 indicators in a single construct (e.g. CA) and the use of one indicator by construct as it is the case with the construct on Incentive link to BSC implementation, suggest PLS-SEM to be the suitable method.

Section 4.6.4 in the Research Methodology chapter has already provided explanations on the steps that need to be followed for the evaluation of both measurement and structural models and provided the rules of thumb for each step. The evaluation of measurement models is conducted in the previous section and the results suggest that all of the indicators used in this research are relevant for capturing the content of their constructs. The previous analysis also suggests the suitability of the measurement models for the second stage of PLS-SEM. This section discusses the evaluation of the structural models. The structural model evaluation steps will be conducted separately for each one of the three research frameworks proposed in this study.

As discussed in the Research Methodology chapter, the goodness of fit criteria applied in CB-SEM, such as Goodness of Fit Index (GFI), Comparative Fit Index (CFI) and Chi-squared test, are not relevant to PLS-SEM (Hair et al., 2013). The criteria used for the assessment of the structural model for PLS-SEM using formative models are the multi-collinearity between different constructs, path coefficient (β) and coefficient of determination (R^2) (Henseler et al., 2009; Henseler et al., 2014; Hair Jr et al., 2016). Path coefficients are standardized versions of linear regression weights that are used to examine the possible causal relationships between research variables in the SEM approach. This standardization implies multiplying the ordinary regression coefficients by the standard deviations of the related variables. The result can then be compared to assess the impact of the research variables within the tested regression model. The coefficient of determination indicates the percentage of variation in the dependent variable that is predictable from the independent variable. Based on the percentage of the total variation of outcomes explained, it also measures how well the observed indicators are replicated by the model.

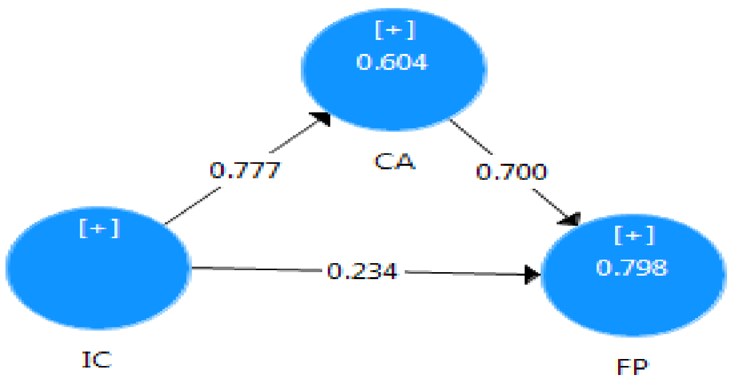
To conduct the evaluation of the structural models, the second stage model of the second order model evaluation presented in Figures A.3.1, A.3.2 and A.3.3 included in Appendix A will be used. In this model, IC becomes a first order construct measured by the latent variable scores of HC, SC and RC as indicators. This model is used to test multi-collinearity between constructs, path coefficients and coefficients of determination for all the proposed relationships in each of the three research frameworks.

6.2.2.1 Multi-collinearity between latent variables

Multi-collinearity between variables shows that there is a linear relationship between two or more exogenous or independent variables (Hair et al., 1998, Tabachnick and Fidell, 2007). Tabachnick and Fidell (2007) argue that it is difficult to compute the estimate of the regression model when there are prefect linear relationships between independent variables. Table 6.5 below presents the multi-collinearity and the path coefficients for all the research frameworks in this study.

The first research framework (RF1) includes three constructs namely, IC, CA and FP. This study proposes that IC level in each firm has a positive relationship with both CA and FP. The study also proposes that CA mediates the relationship between IC and FP. This research framework is presented in Figure 6.1.

Figure 6.1: Path coefficients for RF1



All the constructs used in RF1 are exogenous because all constructs are formative and are explaining their indicators. Therefore, the multi-collinearity test should be applied to all the constructs within the research framework. This test suggests that the multi-collinearity between each set of predictor constructs[19] should be examined separately. In terms of the model above, there are three relationships, so the test needs to be conducted for each set of construct representing each relationship separately. The results provided in Table 6.5 show that all tolerance and VIF values are at the standard level, suggesting that multi-collinearity for the three relationships is not an issue for concern for all of the predictor constructs present in RF1.

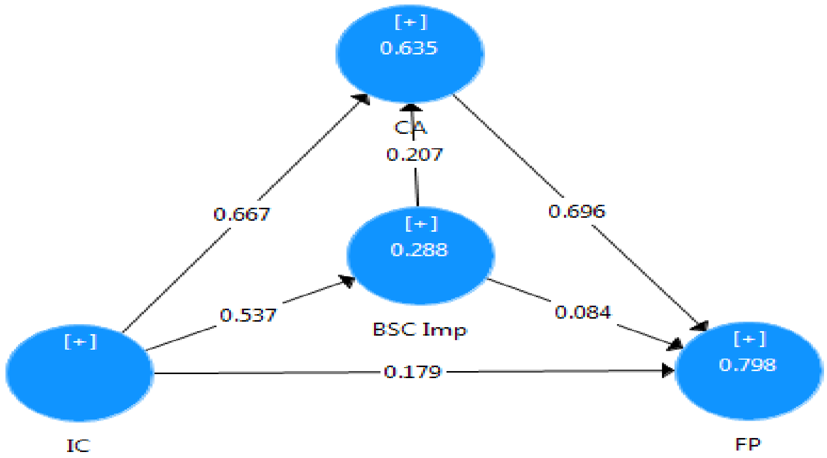
Table 6.5: Multi-colinearity between predictor constructs

Predictor construct	Tolerance	VIF
First research framework		
IC => CA	1.000	1.000
CA => FP	0.396	2.525
IC => FP	0.396	2.525
Second research framework		
BSC Imp -> CA	0.712	1.405
BSC Imp -> FP	0.657	1.523
CA -> FP	0.365	2.741
IC -> BSC Imp	1.000	1.000
IC -> CA	0.712	1.405
IC -> FP	0.381	2.623
Third research framework		
BSC Imp -> BSC Level	1.000	1.000
BSC Imp -> BSC Success	0.201	4.970
BSC Imp -> CA	0.305	3.283
BSC Imp -> FP	0.303	3.302
BSC Imp -> Incentive Link	1.000	1.000
BSC Imp -> Top MGMT support	1.000	1.000
BSC Level -> BSC Success	0.218	4.577
BSC Success -> CA	0.308	3.247
BSC Success -> FP	0.303	3.299
CA -> FP	0.354	2.826
IC -> BSC Imp	1.000	1.000
IC -> CA	0.676	1.479
IC -> FP	0.365	2.736
Incentive Link -> BSC Success	0.381	2.627
Top MGMT support ->BSC Success	0.368	2.715

[19] Predictor constructs are any two linked together where one construct predict the other.

The second research framework (RF2) adds the BSC implementation extent to the existing variables included in RF1 as a fourth variable. This research framework suggests that IC has a positive impact on BSC implementation extent, CA and FP. The research framework also suggests that BSC implementation extent mediates the relationship between IC and CA, and between IC and FP. It also suggests that CA mediates the relationship between BSC implementation extent and FP. The research framework is presented in Figure 6.2 below.

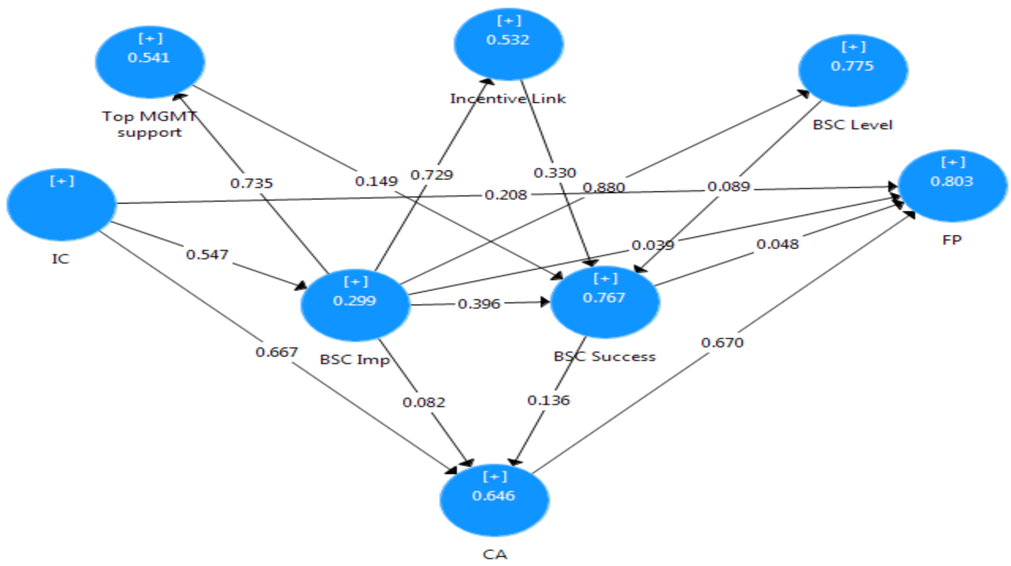
Figure 6.2: Path coefficients for RF2



The multi-collinearity information presented in Table 6.5 show that multi-collinearity between different sets of predictor constructs is not an issue for RF2 because all VIFs were less than 5 and tolerance values are greater than 0.2. Therefore, the model is suitable for further investigation.

The third research framework (RF3) is the most complicated of all three frameworks. This framework links IC, BSC implementation level, BSC success level, CA and FP. It also considers the impact of three success factors, namely BSC implementation at different business units of the firm, management support and linking incentive to BSC implementation, on the BSC success level. The relationships between these variables are presented in Figure 6.3 below. Compared to RF2 the BSC success level is added to the relationships between BSC implementation extent and both CA and FP. The framework presents five mediated relationships, which are (i) the mediation impact of BSC implementation extent on the relationship between IC and CA, (ii) the mediation impact of BSC implementation extent on the relationship between IC and FP, (iii) the mediation impact of BSC success level on the relationship between BSC implementation extent and CA, (iv) the mediation impact of BSC success level on the relationship between BSC implementation extent and FP, and (v) the mediation impact of CA on the relationship between BSC success level and FP. The framework also suggests the three success factors as moderators for the relationship between BSC implementation extent and BSC success level.

Figure 6.3: Path coefficients for RF3



The results presented in Table 6.5 suggest that multi-collinearity is not an issue for concern with all tolerance values >0.2 and all VIF values <5.

The analysis provided above suggests the absence of the multi-collinearity problem for all exogenous constructs presented by the three research frameworks. Therefore, all the research variables are suitable for determining the path coefficients and coefficients of determination for all the proposed relationships. The path coefficients and hypotheses evaluation analysis are discussed in the next section.

6.2.2.2 Path Coefficients

The path coefficient represents the strength or the weakness of the relationship between different variables. Table 6.6 analyses the relationships between all of the variables presented in the three proposed research frameworks. The path coefficients for the same variable differ from one framework to another, depending on the types and number of variables included in the framework. Table 6.6 provides both the path coefficients and significance test results for all relationships. Any path coefficient that holds t-value above 1.96 and p-values below 0.05 is considered to be significant and provides support for the proposed relationship under investigation. The path coefficients for the three research frameworks, i.e. RF1, RF2 and RF3, are analysed in the sections below.

Table 6.6: Hypothesis testing

Hypotheses proposed	Path Coefficient β	p value	Significance	Support
First research Framework				
H1A: IC => CA	0.777	0.000	***	**Supported**
H1B: CA => FP	0.700	0.000	***	**Supported**
H1C: IC => FP	0.234	0.000	***	**Supported**
Second research Framework				
H2.1B: BSC Imp -> CA	0.207	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	0.084	0.000	***	**Supported**
H1B: CA -> FP	0.696	0.000	***	**Supported**
H2.1A: IC -> BSC Imp	0.537	0.000	***	**Supported**
H1A: IC -> CA	0.667	0.000	***	**Supported**
H1C: IC -> FP	0.179	0.000	***	**Supported**
Third research Framework				
H3.1C: BSC Imp -> BSC Level	0.880	0.000	***	**Supported**
H3.4A: BSC Imp -> BSC Success	0.396	0.000	***	**Supported**
H2.1B: BSC Imp -> CA	0.082	0.016	**	**Supported**
H2.2A: BSC Imp -> FP	0.039	0.142	**Insignificant**	**Supported but affected by mediator**
H3.1B: BSC Imp -> Incentive Link	0.729	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.735	0.000	***	**Supported**
H3.2C: BSC Level -> BSC Success	0.089	0.019	**	**Supported**
H3.4B: BSC Success -> CA	0.136	0.000	***	**Supported**
H3.5A: BSC Success -> FP	0.048	0.066	**Insignificant**	**Supported but affected by mediator**
H1B: CA -> FP	0.670	0.000	***	**Supported**
H2.1A: IC -> BSC Imp	0.547	0.000	***	**Supported**
H1A: IC -> CA	0.667	0.000	***	**Supported**
H1C: IC -> FP	0.208	0.000	***	**Supported**
H3.2B: Incentive Link -> BSC Success	0.330	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.149	0.000	***	**Supported**

6.2.2.2.1 Path coefficients for RF1

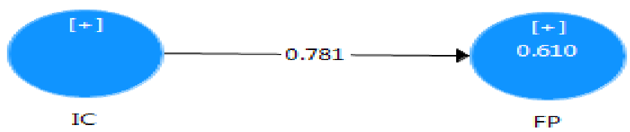
As discussed earlier, RF1 investigates three relationships represented by hypotheses H1A, H1B and H1C, and one mediated relationship represented by H1D. The mediation relationship will be discussed in section 6.2.2.4 of this chapter. Table 6.6 provides the path coefficients analysis for the RF1. It shows that all the path coefficients for all the three relationships are significant providing support to the hypotheses H1A, H1B and H1C. The study conducted by Kamukama et al. (2011) tested the framework but at specific industry. This study tests the same framework with respondents coming from different industries, which allows generalization of the findings and extends the framework further in RF2 and RF3.

The path coefficient for the relationship between IC and CA is 0.777, which is positive and highly significant, supporting the proposed hypothesis H1A in that high IC firms tend to have greater CA than low IC firms. This finding is consistent with that of Kamukama et al. (2011) who found a positive and significant relationship between IC and CA (with a path coefficient of 0.351) in micro-finance institutions in Uganda.

The path coefficient between CA and FP is 0.700, which is positive and significant, supporting the proposed hypothesis H1B in that firms with high CA tend to perform better than low CA firms. This finding is consistent with those of previous studies, such as Kamukama et al. (2011) (with a path coefficient of 0.340) and Zhou et al. (2009) (with path coefficients of 0.320 and 0.240 for the relationship between FP and each of the two types of CA, namely innovation differentiation advantage and market differentiation advantage, respectively) in their study on international hotel industry The finding from this study is much stronger than those from Kamukama et al. (2011) and Zhou et al. (2009).

The third hypothesis of RF1 is H1C which proposes that high IC firms outperform low IC firms. This also suggests that as the IC level increases, the FP increases accordingly. This relationship is the base for all the investigation of this study, and it is built up by adding more variables in each of the three research frameworks. This helps to investigate the other factors that affect value creation when the firm invests in IC resources. The path coefficient for the relationship in RF1 is found to be 0.234 with CA as a mediator. However, when the relationship of IC and FP is tested separately, the path coefficient is 0.781 as presented in Figure 6.4 below. There is therefore evidence of the mediation impact of CA on the relationship between IC and FP. Further discussions on the mediation impact will be provided in Section 6.2.2.4 later. The finding is consistent with those of Kamukama et al. (2011) who found the path coefficient to be 0.540 for the relationship without the mediating impact of CA and a path coefficient of 0.42 with the mediating impact of CA. Given that a good mediator impact reduces the path coefficient of the indirect relationship, the findings from this study suggest that CA places a mediating role in the relationship between IC and FP. Both Youndt et al. (2004) and Tayles et al. (2007) investigated the relationship between IC and FP. However, Youndt et al (2004) examined each IC components separately and Tayles et al. (2007) divided firms into high IC and low IC firms. This study differs from those two studies in that it links all IC components and FP in one framework. However, this study agrees with them that there is positive and significant relationship between IC and FP.

Figure 6.4: The path coefficient for the relationship between IC and FP without mediator



6.2.2.2.2 Path coefficients for RF2

This framework is an extension to RF1 (see Figure 6.2). It proposes three direct impact (H2.1A, H2.1B, and H2.2A) and three mediated impact hypotheses (H2.1C, H2.2B and H2.3A) in addition to the four hypotheses discussed in the RF1 (H1A, H1B and H1C). The path coefficients for H1A, H1B and H1C are reduced from 0.777, 0.234, and 0.700 respectively to 0.667, 0.179 and 0.696 respectively. The reduction in H1A and H1B is due the mediation impact which will be discussed in section 6.2.2.4 and the reduction in H1C is not a major and it is due to latent score calculation differences during second order model evaluation stages.

Hypothesis H2.1A proposes that the firms' level of IC is positively associated with the extent of the BSC implementation. This also proposes that as the level of IC increase in the firm, the higher the BSC implementation extent is required. Table 6.6 shows that the bath coefficient for this relationship is 0.537 which is positive significant value. This link was suggested by Tayles et al. (2007), but it was found that BSC was not widely implemented among firms operating within the Malaysian market, so their hypothesis was not supported. However, their study found a high positive link between IC level and financial and non-financial measures, which indicate that there is positive link between IC level and IC measurement. Their suggestion is also on line with the statement by Chen and others: *'From a strategic perceptive, IC is used to create and enhance the organizational value, and success requires IC and the ability to manage this scarce resource*' (Chen et al., 2004, p.195). Kaplan and Norton, as founders of BSC, also stated that *'The strategy map and BSC enable organizations to describe intangible assets, align and integrate them to the strategy, and measure the assets and their alignment'* (Kaplan and Norton, 2004, p. 6). They also argue that the introduction of BSC is to cope with knowledge management requirements (Kaplan and Norton, 1996b). To support the above statements and compare to previous studies which investigate the BSC usage or implementation, this study is linking IC level to the BSC implementation extent which is investigated for the first time This study support this link and found that high IC level in the firms operate in the Omani market is associated with high BSC implementation. The finding suggests that high IC firms need to integrate BSC in their strategy building and to show a high extent of BSC implementation in order to generate value from IC.

Hypothesis H2.1B proposes that firms associated with a high extent of BSC implementation have greater CA than those with a less extent of implementation. This hypothesis is investigated by this study for the first time. It is based on the RBV theory that suggests that good IC management leads to better CA (Sirmon et al., 2007). Kaplan and Norton (2008) also argue that the formation of firm strategies using any strategic management tool including BSC leads to superior CA. To support these thoughts this study found that the path coefficient for this relationship is 0.207 with p-value < 0.01. Therefore, hypothesis H2.1B, which proposes that BSC implementation extent is positively and significantly associated with the firm CA, is strongly supported.

H2.2A links the BSC implementation extent to the FP and proposes that the firms with high BSC implementation extent outperform those with low implementation extent. The relationship between BSC and FP is highly investigated in the literature (Hoque and James, 2000; Davis and Albright, 2004; De Geuser et al., 2009). However, all the previous studies investigated the link between BSC usage as a management tool and FP, which is different from this study which investigates the link between BSC implementation extent and FP. All firms might start implementing the BSC, but the extent of implementation might differ from one to another. The result in Table 6.6 found that this relationship is positive and significant with path coefficient of 0.084 and p-value < 0.01. This relationship is affected by mediator which reduces the path coefficient from 0.585 (without mediator) to 0.084 (with mediator) which shows the big impact of the mediator (see the mediator impact section below for more detail). The mediator impact will be thoroughly discussed in section 6.2.2.4. The result provides a strong support to hypothesis H2.2A.

6.2.2.2.3 Path coefficients for RF3

This research framework is an extension to the RF2. Compared to RF2, the BSC implementation success and BSC success factors are added as an extension to RF2. The framework in total discuses 27 relationships represented by 27 hypotheses. Among them are nine mediation relationships that will be discussed later in section 6.2.2.4. Fifteen hypotheses results are discussed in Table 6.6, out of which nine are new and six previously discussed. Six out of the twelve already discussed in RF1 and RF2 above. The six hypotheses are also found to be supported by this research framework as all the relationships are found to be positive and significant except hypothesis H2.2A. This hypothesis represents the relationship between BSC implementation extent and FP. This hypothesis is supported but the result is not significant due to the mediator impact that will be discussed latter in this chapter. The nine new hypotheses, which are H3.1A, H3.1B, H3.1C, H3.2A, H3.2B, H3.2C, H3.4A, H3.4B and H3.5A, will be discussed in this section.

This study proposes that firms with a high extent of BSC implementation are more successful in BSC implementation than those with a low extent of BSC implementation as suggested by hypothesis H3.4A. Kaplan and Norton stressed the need to consider all BSC aspects when implementing it for successful implementation (Kaplan and Norton, 1992, 1996a, 1996b, 2001, 2006, 2008). The main criteria for BSC implementation are to include all financial and non-financial performance measures (Kaplan and Norton, 1992, 2004), to consider cause-and-effect relationship between different measures (Kaplan and Norton, 1992), aligning performance measures to firm's strategies (Kaplan and David, 2001), to set target for each strategy achievement (Kaplan and Norton, 2001) and to link incentive plans to BSC implementation (Kaplan and Norton, 2008). This hypothesis is a new contribution to the literature. The result in Table 6.6 shows that the path coefficient for this relationship is 0.396 and it is significant with p-value < 0.01. This result provides strong support to the hypothesis. This result also indicates that the high extent of BSC implementation is associated with high success in BSC implementation. So, as the extent of the implementation increases firms will become more successful in their BSC implementation.

Hypotheses H3.1A, H3.1B and H3.1C link the extent of BSC implementation to the three success factors (management support to BSC implementation, the incentive link to BSC implementation and BSC implementation at different business units of the firm). The three hypotheses suggest that firms with high extent of BSC implementation are associated with high management support, high link of incentives to BSC implementation and high BSC implementation at different business units of the firm. Kaplan and Norton (1998, 2008) argue for the importance of senior management involvement and support, employee motivation through linking incentives to BSC implementation and making BSC everyone’s job by implementing it at different business units of the firm for better and successful BSC implementation. The finding of this study supports their argument and proves that there is a positive and significant relationship between the extent of BSC implementation and the three success factors. The path coefficients for the three relationships are 0.735, 0.729 and 0.880 respectively and they are very strong and significant relationships with p-values below 0.01. The finding provide a very strong support for the three hypotheses.

The hypotheses H3.2A, H3.2B and H3.2C are proposing that there are relationship between the three success factors (management support to BSC implementation, the incentive link to BSC implementation and BSC implementation at different business units of the firm) and the success in BSC implementation. These three hypotheses are investigated for the first time in the literature. The literature shows that the three success factors played an important role in enhancing BSC implementation and lead to better firm performance (Kaplan and Norton, 1998, 2008). They also argue that considering these factors leads to successful implementation. The path coefficients for the three hypotheses are 0.149, 0.330 and 0.089 respectively and all of them are significant with a p value < 0.05. This finding provides significant support that the management support of BSC implementation, incentive link to BSC implementation and implementing BSC at different business units of the firms lead to better success in BSC implementation. So, the firms which consider the three factors during BSC implementation achieve better success in BSC implementation.

The fifth hypothesis in RF3 is H3.4B, which suggests that firms that are more successful in BSC implementation have greater CA. Since BSC is considered an important management tool and is used to execute important business strategies, it helps to enhance firms' competitiveness (Kaplan and Norton, 1996b). This relationship is investigated for the first time and adds a new contribution to the literature. The result shows that the path coefficient for this relationship is 0.136 which is significant with p-value < 0.01. The finding provides strong support to the hypothesis. Therefore, this study provides evidence that the firms with a high level of success in BSC implementation are associated with greater CA.

The last hypothesis in this research framework is H3.5A which suggests that firms with greater success in BSC implementation outperform those with less success. It is like most the previous hypotheses in this research framework for being new and investigated for the first time. Kaplan and Norton argue that the firm success in BSC implementation and the execution of good strategy will result in better FP (Kaplan and David, 2001). The result shows that the path coefficient for this relationship is 0.048 which is insignificant with a p-value > 0.05. The result for this relationship is positive, which indicates that the greater the success in BSC implementation the more successful is the firm. However, this relationship is mediated by the CA, which reduces the path coefficient of this relationship and makes it insignificant. The mediator impact will be discussed in section 6.2.2.4 of this chapter. Based on that, this study provides good support for the hypothesis.

To conclude, all the direct impact relationships proposed by the three studies are positive and supported by the analysis provided in Table 6.6. These results support this study argument that the relationship between IC and FP is indirect via BSC implementation extent, the three success factors, the success in BSC implementation and CA. To investigate this argument further and provide stronger support, the mediator impact will be discussed in sections 6.2.2.4 and 6.2.2.5. The next section will discuss the coefficients of determination R^2 for the above hypothesis for more support.

6.2.2.3 Coefficients of determination R^2

The coefficient of determination explains the percentage of variation in dependent variable(s) explained by the independent variable (Hair et al., 2013), and thus R^2 is calculated for endogenous variables only. When $R^2= 1$, the regression line explains the data perfectly. More specifically, if the model provides p-values more than 0.95 confidence interval or less than 0.05, then the structural model is considered to be a good fit for the data. R^2 significance can also be measured using t values. T values more than 1.96 are considered to be significant (Hair Jr et al., 2016). Moreover, Falk and Miller (1992) recommend that R^2 value of 0.10 is substantial. However, the acceptable values for R^2 in the field of management accounting is between 0.17 and 0.42 (Vandenbosch, 1999, Chenhall, 2005). Results for the R^2 values and their significance levels for all dependent variables within the three research frameworks are presented in Table 6.7.

The RF1 has two dependent variables CA and FP. The CA depends on IC and FP depends on both IC and CA. The R^2s of CA and FP are 0.604 and 0.798 respectively, suggesting that the independent variable IC explains 60.4% of the variation in CA, and the independent variables of IC and CA explain 79.8% of the variation in FP. The t-statistics and p-values for both R^2 values are significant at 1% level, suggesting that the structural model in RF1 has a good fit with the data collected.

Table 6.7: R Square values for the three research frameworks				
Constructs	**R²**	**t-Statistics**	**p-values**	**Significant**
First research framework				
CA	0.604	28.720	0.000	***
FP	0.798	57.626	0.000	***
Second research framework				
BSC Imp	0.288	9.831	0.000	***
CA	0.635	31.292	0.000	***
FP	0.798	55.678	0.000	***
Third research framework				
BSC Imp	0.299	10.151	0.000	***
BSC Level	0.775	36.571	0.000	***
BSC Success	0.767	38.481	0.000	***
CA	0.646	33.626	0.000	***
FP	0.803	62.226	0.000	***
Incentive Link	0.532	19.815	0.000	***
MGMT support	0.541	21.965	0.000	***

For RF2, coefficients of determination R^2 are calculated for the dependent variables of BSC implementation level, CA and FP. The R^2 values of the BSC implementation extent is 0.288, suggesting that IC explains 28.8% of the variation in the BSC implementation level. The R^2 value for CA is 0.635, implying that IC and BSC implementation extent explain 63.5% of the variation in the firm' CA. The highest R^2 of 0.798 is presented by FP, implying that IC, BSC implementation extent and CA explain 79.8% of the variation in the dependent variable FP. The t-statistics and p-value for all R^2 values are below the 0.05 confidence interval, suggesting that the structural model provided by this research framework fits the collected data well.

For RF3, the R^2 is calculated for the dependent variables, i.e. BSC implementation extent, BSC implementation success, management support, incentive link, BSC level, CA and FP. The results show the R^2 value for BSC implementation extent is 0.299, which indicates that the independent variable of IC explains 29.9% of the variation in BSC implementation extent. The R^2 value for the BSC implementation success is 0.767, which means that the independent variables of BSC implementation extent, BSC implementation at different business units of the firm, the incentive link to BSC implementation and management support to BSC implementation explain 76.8% of the variation in the BSC implementation success. The result also shows that the change in BSC implementation extent explain 54.1% of the change in management support to BSC implementation, 53.2% of the change in incentive link to BSC implementation and 77.5% of the change in BSC implementation at different business units of the firm. The CA shows R^2 value of 0.646, which indicate that 64.6% of the variation in CA is explained by the change in BSC implementation extent and BSC implementation success. The R^2 of FP is 0.803, which explains that the independent variables of IC, BSC implementation extent, BSC implementation success and CA explain 80.3% of the variation in the dependent variable FP. The t-statistics and p-value for all R^2 values are below 0.01 confidence interval, which suggest that the structural model provided by RF3 fits the collected data well.

6.2.2.4 The mediator impact evaluation

The impact of a mediator and how to test such impact using SmartPLS were explained in detail in Section 4.6.4 of the Research Methodology chapter. This study includes seven mediation relationships described within the three research frameworks. These eight mediation relationships are covered as follows: one hypothesis (H1D) in RF1, three hypotheses (H2.1C, H2.2B and H2.3A) in RF2, and six hypotheses (H3.3A, H3.3B, H3.3C, H3.4C, H3.4D and H3.5B) in RF3. RF1 hypothesis is tested in RF2 and RF3 and the hypotheses for RF2 will be tested again in RF3. Although they are the same hypotheses and are tested using the same dataset, the model specifications differ from one model to another, especially when it deals with second-order constructs. Therefore, this section discusses each hypothesis separately and will check if they are supported or not within each of the three research frameworks. The results for all of the mediator impacts in the three research frameworks are presented in Table 6.8. The indirect impacts of all mediation relationships are found positive and significant for most of the cases except for the relationship between the success in BSC implementation and FP that will be highlighted separately within the discussion (see Table 6.6). Table 6.8 shows the results for the direct impact of the mediated relationships and their levels of significance.

Table 6.8: Mediator test for the three research frameworks				
The effect	**Path Coefficient**	**t-Statistics**	**p-value**	**Significant if t-statistics ≥ 1.96 and P-value < 0.05**
First research framework				
First Mediator: (CA) H1D				
Direct affect between IC and FP without mediator	0.781	59.648	0.000	Significant
Direct affect between IC and FP with mediator	0.234	8.639	0.000	**Significant Partial mediator**
Second research framework				
First Mediator: (BSC Implementation + CA) H1D & H2.2B				
Direct affect between IC and FP without mediator	0.767	57.091	0.000	Significant
Direct affect between IC and FP with BSC Imp. as mediator	0.644	25.151	0.000	**Significant Partial mediator**
Direct affect between IC and FP with CA as mediator	0.199	7.151	0.000	**Significant Partial mediator**
Direct affect between IC and FP with both mediators	0.179	6.823	0.000	**Significant Partial mediator**
Second Mediator: (BSC Implementation) H2.1C				
Direct affect between IC and CA without mediator	0.784	60.075	0.000	Significant
Direct affect between IC and CA with mediator	0.667	28.559	0.000	**Significant Partial mediator**
Third Mediator: (CA) H2.3A				
Direct affect between BSC Implementation and FP without mediator	0.585	22.734	0.000	Significant
Direct affect between BSC Implementation and FP with mediator	0.084	4.150	0.000	**Significant Partial mediator**
Third research framework				
First Mediator: (BSC Implementation + CA) H1D & H2.2B				
Direct affect between IC and FP without mediator	0.785	58.064	0.000	Significant
Direct affect between IC and FP with BSC Imp. extent as mediator	0.675	29.418	0.000	**Significant Partial mediator**
Direct affect between IC and FP with CA as mediator	0.233	7.957	0.000	**Significant Partial mediator**
Direct affect between IC and FP with the two mediators	0.208	7.698	0.000	**Significant Partial mediator**

Continue table 6.8: Mediator test for the three research frameworks				
The effect	**Path Coeffi-cient**	**t-Statistic**	**p-value**	**Significant if t-statistics ≥ 1.96 and P-value < 0.05**
Third research framework				
Second Mediator: (BSC Imp) H2.1C				
Direct affect between IC and CA without mediator	0.791	58.677	0.000	Significant
Direct affect between IC and CA with mediator	0.667	27.378	0.000	**Significant Partial mediator**
Third Mediator: (Top MGMT support + Incentive Link + BSC Imp. Level) H3.3A, H3.3B & H3.3C				
Direct affect between BSC Implementation extent and BSC success without mediator	0.830	50.883	0.000	Significant
Direct affect between BSC Implementation extent and BSC success with MGMT support as mediator	0.601	20.181	0.000	**Significant Partial mediator**
Direct affect between BSC Implementation extent and BSC success with Incentive link as mediator	0.510	14.182	0.000	**Significant Partial mediator**
Direct affect between BSC Implementation extent and BSC success with BSC Level as mediator	0.676	18.656	0.000	**Significant Partial mediator**
Direct affect between BSC Imp. extent and BSC success with the three mediator	0.396	8.730	0.000	**Significant Partial mediator**
Fourth Mediator: (BSC Success + CA) H2.3A & H3.4D				
Direct affect between BSC Imp. extent and FP without mediator	0.585	24.862	0.000	Significant
Direct affect between BSC Imp. Extent and FP with BSC success as mediator	0.314	6.213	0.000	**Significant Partial mediator**
Direct affect between BSC Imp. extent and FP with CA as mediator	0.108	4.940	0.000	**Significant Partial mediator**
Direct affect between BSC Imp. Extent and FP with mediator	0.039	1.469	0.142	**insignificant full mediator**
Fourth Mediator: (BSC Success + CA) H2.3A & H3.4D				
Direct affect between BSC Imp. extent and FP without mediator	0.585	24.862	0.000	Significant
Direct affect between BSC Imp. Extent and FP with BSC success as mediator	0.314	6.213	0.000	**Significant Partial mediator**
Direct affect between BSC Imp. extent and FP with CA as mediator	0.108	4.940	0.000	**Significant Partial mediator**
Direct affect between BSC Imp. Extent and FP with mediator	0.039	1.469	0.142	**insignificant full mediator**

Continue table 6.8: Mediator test for the three research frameworks				
Path Coefficient	**t-Statistics**	**p-value**	**p-value**	**Significant if t-statistics ≥ 1.96 and P-value < 0.05**
Continue third research framework				
Fifth Mediator: (BSC Success) H3.4C				
Direct affect between BSC Imp. extent and CA without mediator	0.573	21.646	0.000	Significant
Direct affect between BSC Imp. extent and CA with mediator	0.082	2.413	0.016	**Significant Partial mediator**
Sixth Mediator: (CA) H3.5B				
Direct affect between BSC success and FP without mediator	0.590	25.830	0.000	Significant
Direct affect between BSC success and FP with mediator	0.048	1.846	0.066	**insignificant full mediator**

Hypothesis H1D predicts that IC has an indirect effect on FP via the firm's CA. This relationship was previously investigated by Kamukama et al. (2011) who found that CA mediates the relationship between IC and FP. The finding of their study was specific to micro finance industry. This study extends on Kamukama et al. (2011) by examining the issue in a number of different industries in order to generalize the finding. Moreover, this relationship is the base for all other relationships that will be investigated in this study, more specifically in RF2 and RF3. The results in Table 6.6 suggest that all the indirect relationships for the mediating impact are significant for the three research frameworks. Table 6.8 shows that the path coefficient for the relationship between IC and FP without the mediator impact is 0.781, 0.767 and 0.787 for RF1, RF2 and RF3 respectively and it is highly significant ($p < 0.01$). When adding the CA as a mediator in RF1, the path coefficient between IC and FP reduces to 0.234, but remains significant at the 1% level. In RF2, the path coefficient is reduced to 0.179, but there are two mediators in the framework, which are CA and the BSC implementation extent. In RF3, the path coefficient is 0.207. This relationship is also tested with each component of IC, i.e. HC, SC and RC, and found similar results because all of the path coefficients of specified relationships are significant (see Tables A.3.2, A.3.3 and A.3.4 given in appendix A for individual IC component analysis). The result suggests the relationship between IC and FP is partially mediated by CA, supporting hypothesis H1D. This result is consistent with Kamukama et al. (2011)

who found that the CA is partially mediating the relationship between IC and FP, as the path coefficient of the relationship between IC and FP reduced from 0.540 without the mediator to 0.420 after adding the mediator impact. Based on this finding this study can propose generalizing this hypothesis finding to all industries. However, the generalization is restricted to the firms operating within the Omani market.

The hypothesis H2.2B in RF2 suggests that the relationship between IC and FP is also mediated by the BSC implementation level. Since BSC is used as a management tool for IC resources, this study proposes that the impact of IC on FP is indirect, which needs to go through IC management or BSC implementation as a tool for IC resources management. This hypothesis is investigated for the first time in the literature. Thus, the relationship between IC and FP has two mediators in RF2 and RF3, which are CA and BSC Imp. Table 6.6 shows that the path coefficients for the indirect paths of IC & BSC Imp and BSC Imp & FP are is 0.537 and 0.084 respectively, and are both significant with p value < 0.05. The results in Table 6.8 also show that the direct impact of IC on FP is 0.767 without any mediator and 0.179 with the mediators, and both paths are significant with p values < 0.05. The reduction in the path coefficient is huge which indicates strong mediating impact of CA and BSC Implementation extent on the relationship between IC and FP. However, the path coefficient for the direct relationship with the inclusion of the mediator remains significant, which suggests that both CA and BSC implementation extent partially mediate the relationship between IC and FP. To check which one of the two mediators has more impact on this relationship, Hair Jr et al. (2016) suggest separating them into different models and evaluating each relationship separately. Table 6.8 below shows the analysis of H2.2B twice under RF2 and RF3. Under RF2, the direct impact of IC on FP is 0.199 by including the mediating impact of CA, and 0.644 by including the mediating impact of BSC implementation level. RF3 showed similar results on the direct impact of IC on FP, in that the path coefficient is 0.233 with CA as the mediator, and 0.675 with BSC implementation extent as the mediator. The results indicate that CA has greater mediating impact than BSC implementation extent on the relationship between IC and FP.

The next mediating impact is represented by hypothesis H2.1C, which proposes that the relationship between IC and CA is not direct but mediated by the BSC implementation extent. This also suggests that firm investment in IC will not be directly translated into competitive capabilities, but rather IC resources need to be managed appropriately through the use of BSC. This hypothesis is investigated for the first time. This hypothesis appears both in RF2 and RF3, and the relationship between IC and CA has one mediator impact in both research frameworks, i.e. BSC Implementation extent. Table 6.6 shows that the path coefficients for the indirect relations (i.e. IC and BSC Implementation extent and BSC Implementation extent and CA) are 0.537 and 0.207, respectively, both of which are significant with p value < 0.05. The direct impact analysis given in Table 6.8 also shows that the direct path coefficient for the relationship between IC and CA reduces from 0.784 without the mediator to 0.667 by including the mediator impact of BSC Implementation extent. RF3 shows similar results as the direct path coefficient between IC and CA reduces from 0.791 (without mediator) to 0.666 (when including the BSC Implementation extent as the mediator). Although the reduction is not substantial, BSC implementation extent is considered a good mediator for the relationship between IC and CA. From the above results, firms are recommended to implement BSC in full in order to become competitively successful.

The next mediating impacts is associated with H3.3A, H3.3B, and H3.3C. The three hypotheses suggest that the three success factors (management support to BSC implementation, incentive link to BSC implementation and BSC implementation at different business units of the firm) mediate the relationship between BSC implementation extent and the success in BSC implementation. The results in Table 6.6 show that the indirect relationship between BSC implementation extent with all the three success factors and the relationship between the three success factors and success in BSC implementation are all positive and significant. The direct path for this relationship without the mediators is found significant at 1% interval with path coefficient of 0.830. The path of this relationship reduced to 0.601 with the impact of management support, 0.510 with incentive link to BSC implementation and to 0.676 with the impact of implementing BSC at different business units of the firm. However, the path reduced to 0.396 with the impact of the three mediators. This shows that the incentive link to BSC implementation has a more mediating impact to the relationship between BSC implementation and the success in BSC implementation compared to the other two factors. Considering that all the path coefficients for the mediators' impact are significant, this concludes that all the three success factors are partially mediating the relationship between BSC implementation extent and the success in BSC implementation.

Hypothesis H3.4D is associated with FR3 only. This hypothesis proposes that the success in BSC implementation mediates the relationship between BSC implementation extent and FP. It also proposes that implementation of BSC is not enough to create value. Firms need to be successful in BSC implementation to create more value and enhance performance. The path between BSC implementation extent and FP includes two mediators. The first mediator is CA, which is discussed under hypothesis H2.3A above, and the second mediator is the success in BSC implementation. This hypothesis is investigated for the first time in the literature. The results in Table 6.6 show that path coefficients for the indirect relationships of BSC implementation extent and BSC success, and BSC success and FP are 0.387 (significant) and 0.048 (insignificant) respectively. However, the relationship between BSC success and FP is mediated by CA as is proposed in hypothesis H3.5B (see the discussion later). The impact of the mediator reduces the path coefficient for the relationship between BSC success and FP from 0.590 (without the mediator) to 0.048 (with CA as the mediator). This leads to a conclusion that the direct path for the relationship between BSC success and FP is significant but the impact of the mediator make it insignificant. However, the results in Table 6.8 show that the path coefficient for the relationship between BSC implementation extent and FP is reduced from 0.585 (significant at 5% level) to 0.040 (insignificant), by including the impact of the two mediators of BSC success and CA. This suggests that the relationship between BSC implementation extent and FP is fully mediated by the success in BSC implementation and CA. The results also show that the mediating impact of CA (reducing the coefficient for the direct path to 0.108) is greater than success in BSC implementation (reducing the coefficient for the direct path to 0.314). This finding provides a recommendation for practitioners to encourage the success in BSC implementation in their organizations in order to create value for the firm and enhance performance.

The seventh mediation hypothesis is H3.4C, which is associated with RF3 only. This hypothesis proposes that the success in BSC implementation mediates the relationship between BSC implementation extent and CA. This hypothesis highlights the importance of the success in BSC implementation. It also informs practitioners that BSC implementation in itself is not enough to compete successfully, but they have to be successful in their BSC implementation. As is shown in Table 6.6, the path coefficients for the indirect relationships of BSC Implementation extent and BSC Success, and BSC Success and CA are 0.387 and 0.138, respectively, both significant at 1% level. The results from mediator analysis presented in Table 6.8 also show that the path coefficient for the direct relationship between BSC Implementation extent and CA reduced from 0.573 ($p < 0.01$) (without mediator) to 0.080 ($p < 0.05$) (by including the BSC Success as mediator). This suggests that the success level in BSC implementation partially mediates the impact of BSC implementation extent on firm CA, and this mediating impact is quite substantial.

The last mediation hypothesis proposed in this study is H3.5B, which is associated with RF3 only. It suggests that the relationship between the success in BSC implementation and FP is mediated by CA. It also suggests that success in BSC implementation does not create value or improve firm performance directly. They need to compete successfully in order to create value. The path coefficients for the two indirect paths for this relationship, i.e. BSC Success and CA, and CA and FP, are 0.138 and 0.670 (both significant at 1% interval), respectively (see Table 6.6). However, the path coefficients for the direct path for the relationship between BSC success and FP reduced from 0.590 ($p <0.01$) (without mediator) to 0.048 (insignificant) (with the mediator of CA). This suggests that CA fully mediates the relationship between the success in BSC implementation and FP.

To summarize, the mediation relationships in RF1 discussed above show that the level of IC in a firm is not enough to create value or enhance FP. Firms need to show high CA which is created through their investment in IC. RF2 also shows that in order to create value from IC investment, firms need to consider implementing BSC or similar performance measurement and management tool to manage IC resources and enhancing firms' CA through managing these resources effectively. RF3 adds another mediator to the relationships between BSC implementation and both CA and FP. The mediating impact suggests that BSC implementation extent is not enough for competing successfully or creating value. Firms implementing BSC needs to achieve high level of success in BSC implementation in order for it to work. All the mediation relationships are found to be partial mediation except for the mediating impact of CA on the relationship between BSC Success and FP, and the mediating impact of both BSC Success and CA on the relationship between BSC implementation extent and FP. All the mediation relationships considered partial mediation except for the mediation impact of CA on the relationship between BSC Success and FP and the mediating impact of both BSC Success and CA on the relationship between BSC implementation extent and FP. Next section will discuss the above relationships when controlling for both firm size and age.

6.2.2.5 Controlling for firm size

One of the tools used to establish the robustness of the hypothesised relationships is to control for different groups using control variables. One of the variables found to have impact on the relationship between IC and FP is firm size (Youndt et al., 2004). In order to investigate the impact of firm size on the given relationship, this study applied the multi-group-analysis (MGA) tool offered by SmartPLS 3. The data is grouped into two groups, i.e. large and very large firms, based on their number of employees (see Section 4.5 of the Research Methodology chapter).

Tables 6.9 and 6.10 present the results of the MGA analysis for the three research frameworks after controlling for company size. Table 6.9 presents the path coefficients for all relationships for the two groups of firms. As is shown in Table 6.9, all path coefficients for relationships within RF1 and RF2 are significant for both large and very large firms and this result is consistent with the main model findings shown in Table 6.6 without controlling for firm size. However, on the other hand, results for RF3 showed insignificant paths for five relationships, as highlighted in bold in Table 6.9. The relationships between BSC implementation extent and FP and between BSC success and FP are not significant and this was due to the mediator impact. The results are consistent with the results shown in Table 6.6 when firm size is not controlled.

However, the path coefficients for the relationships proposed by hypotheses H2.1B, H3.2C and H3.4B become insignificant when controlling for firm size. Hypothesis H2.1B suggests that BSC implementation extent has a positive impact on firms' CA. The results show that the path coefficient for this relationship is positive (0.004) and insignificant for large firms, while it is positive and significant for very large firms. This suggests the importance of BSC implementation extent for enhancing CA for very large firms. Further, the significant result found for very large firms is due to that the relationship is mediated by the success in BSC implementation, in that the success in BSC implementation is full mediator for the relationship between BSC implementation extent and CA for large firms while it is partial mediator for very large firms. Hypothesis H3.2C suggests that firms implementing BSC at different business units of the firm are more successful in BSC implementation. The path coefficients for this relationship are insignificant for both large (0.047) and very large (0.034) firms. Like the case of H2.1B, the main relationship between BSC implementation at different business units and the success in BSC implementation presented in Table 6.6 is not very significant with path coefficient of (0.089) and p-value of (0.19) (see Table 6.6). The level of significance of the main relationship might explain the insignificance of the relationship when controlling for firm size. The path coefficient of the relationship between the success in BSC implementation and CA is also insignificant for very large (0.059) firms. As discussed in hypotheses H2.1B and H3.2C, the level of significance of the main relationship presented in Table 6.6 might be the reason behind the weakness of the path coefficient of very large firms. This explain the importance of the success in BSC implementation in building CA in large firms rather than very large firms. These findings might to some extent suggest the importance of firm size for studying these relationships. However, the results presented in Table 6.10 suggest otherwise.

Table 6.10 shows the calculation of the differences between path coefficients and p-values of the differences between the two groups. The differences in path coefficients are relatively small and insignificant across all relationships in the three research frameworks. Therefore, this study cannot assume the impact of firm size on the relationships represented in the three research frameworks. This finding differs from those of other studies such as

Hoque and James (2000) and Youndt et al. (2004), who consider firm size to be an important factor for studying the impact of both IC and BSC implementation on FP. This might be due to sampling focus because these studies applied to smaller firm size. Youndt et al. (2004) applied their study to firms with more than hundred employees and Hoque and James (2000) applied their study to firms from one employee. This study applied to firms with 500 employees and more.

Table 6.9 : Path coefficient analysis when control for firm size

Proposed relationship	Path coefficient (large)	Path coefficient (very large)	p-values (large)	p-values (very large)
First research framework				
H1A: IC => CA	0.683	0.630	0.000	0.000
H1B: CA => FP	0.789	0.840	0.000	0.000
H1C: IC => FP	0.251	0.307	0.000	0.000
Second research framework				
H2.1B: BSC Imp -> CA	0.174	0.200	0.000	0.000
H2.2A: BSC Imp -> FP	0.065	0.088	0.018	0.001
H1B: CA -> FP	0.679	0.602	0.000	0.000
H2.1A: IC -> BSC Imp	0.591	0.532	0.000	0.000
H1A: IC -> CA	0.677	0.725	0.000	0.000
H1C: IC -> FP	0.211	0.282	0.000	0.000
Third research framework				
H3.1C: BSC Imp -> BSC Level	0.905	0.891	0.000	0.000
H3.3A: BSC Imp -> BSC Success	0.465	0.347	0.000	0.000
H2.1B: BSC Imp -> CA	0.004	0.107	**0.933**	0.034
H2.2A: BSC Imp -> FP	0.012	0.019	**0.775**	**0.664**
H3.1B: BSC Imp -> Incentive Link	0.731	0.748	0.000	0.000
H3.1A: BSC Imp -> Top MGMT support	0.779	0.827	0.000	0.000
H3.2C: BSC Level -> BSC Success	0.016	0.073	**0.838**	**0.157**
H3.4B: BSC Success -> CA	0.211	0.099	0.000	**0.059**
H3.5A: BSC Success -> FP	0.069	0.082	**0.121**	**0.067**
H1B: CA -> FP	0.655	0.594	0.000	0.000
H2.1A: IC -> BSC Imp	0.583	0.525	0.000	0.000
H1A: IC -> CA	0.663	0.730	0.000	0.000

Table 6.10: Significant differences in path coefficients between large and very large firms		
Proposed relationship	**Path coefficient (large - very large)**	**p-value (large versus very large)**
First research framework		
H1A: IC => CA	0.053	0.176
H1B: CA => FP	0.051	0.987
H1C: IC => FP	0.056	0.821
Second research framework		
H2.1B: BSC Imp -> CA	0.025	0.684
H2.2A: BSC Imp -> FP	0.022	0.723
H1B: CA -> FP	0.076	0.081
H2.1A: IC -> BSC Imp	0.058	0.131
H1A: IC -> CA	0.048	0.850
H1C: IC -> FP	0.071	0.889
Third research framework		
H3.1C: BSC Imp -> BSC Level	0.014	0.264
H3.3A: BSC Imp -> BSC Success	0.118	0.134
H2.1B: BSC Imp -> CA	0.103	0.931
H2.2A: BSC Imp -> FP	0.007	0.540
H3.1B: BSC Imp -> Incentive Link	0.017	0.680
H3.1A: BSC Imp -> Top MGMT support	0.047	0.958
H3.2C: BSC Level -> BSC Success	0.057	0.734
H3.4B: BSC Success -> CA	0.112	0.063
H3.5A: BSC Success -> FP	0.013	0.577
H1B: CA -> FP	0.061	0.145
H2.1A: IC -> BSC Imp	0.058	0.144
H1A: IC -> CA	0.067	0.933
H1C: IC -> FP	0.057	0.829
H3.2B: Incentive Link -> BSC Success	0.085	0.803
H3.2A:Top MGMT support ->BSC Success	0.028	0.386

6.2.2.6 Controlling for firm age

Firm age plays an important role in determining the overall firm performance, as older firms are considered to have more experience in running businesses compared to young firms (Coad et al., 2013). Youndt et al. (2004) also argue that *'knowledge creation, diffusion, and storage are inherently evolutionary in nature, the degree to which an organization develops its intellectual capital may vary with its age'* (Youndt et al., 2004, p. 348). This study therefore examines the effect of firm age on the relationships represented in the three research frameworks proposed.

Participating firms are grouped into young and long established firms. Firm age is measured using the number of years a firm operated in the market. As discussed in Chapter 5, the partition of the firms is based on the average firm age within the dataset, i.e. firms that are 4 to 25 years old are classified as young firms and those founded more than 25 years ago are considered as long established firms. Tables 6.11 and 6.12 present the results from the MGA analysis for all the relationships presented in the three research frameworks. Table 6.11 shows the path coefficients and their significance for all relationships for both young and long established firms. Table 6.12 presents the differences in the path coefficients and the significance level of those differences between young and long established firms.

For RF1, the results show that the relationship between IC and CA is stronger for young firms than for long established firms, while the relationships between IC and FP and between CA and FP are stronger for long established firms. This suggests that young firms are better at and/or have greater focus on CA building, whereas the long established firms may be better at reaping its IC and CA into generating better FP, given their experience. The results on the three relationships are consistent for the three research frameworks. Further, results given in Table 6.12 for RF1 show that the difference between young and long established firms is significant for the relationships between CA and FP and IC and FP, whilst it is not significant for the relationship between IC and CA. This lends further support to the argument that long established firms are better at materialising their IC and CA into FP. This lends further support to the argument that long established firms are better at materialising their IC resources and CA into FP. However, results for RF2 and RF3 show that the difference between young and long established firms is significant for relationships of (IC and FP) and (IC and FP), while it is not significant for the relationship between CA and FP. The difference in the results for RF1 and those for RF2 and RF3 can be due to the inclusion of BSC implementation in RF2 and RF3. Overall, the results suggest that there are differences in the core relationships within RF1 between young and long established firms, and thus there is a firm age effect.

RF2 includes three additional relationships in addition to the three included in RF1. Table 6.11 shows that in RF2 the relationship between BSC implementation and FP is not significant for long established firms and it is higher for young firms than long established firms. RF3 shows an insignificant relationship between BSC implementation and FP for both young and long established firms. The results also show that young firms have a stronger relationship than long established firms. This finding can be explained by Hoque and James (2000), who found that firms with products at the early stage of the development give more attention to BSC implementation in order to get more benefit. The main reason for this result is the mediating impact of the success on BSC implementation and CA on the relationship between BSC implementation extent and FP. Table 6.6 shows that the relationship between BSC implementation extent and FP is insignificant with p-value of 0.074. Table 6.8 also shows that this relationship is fully mediated by the success in BSC implementation and CA. Therefore, the results become insignificant for both young and long established firms. However, Table 6.12 shows that differences between young and long established firms are not significant. Therefore, firm age is not a good control variable for studying this relationship.

The second relationship in RF2 is the relationship between BSC implementation extent and CA which has not been investigated before. The result in Table 6.11 shows that in both RF2 and RF3 this relationship is higher for young firms than for long established firms. The result is significant for both groups in RF2 and insignificant for both groups in RF3. This is because the relationship is direct in RF2 and mediated with the success in BSC implementation in RF3. Which explain that the success in BSC implementation is fully mediate the relationship between BSC implementation extent and CA for both groups. The stronger relationship for the young firms in RF2 might be for the reason that CA advantage development is more important for young firms than long established firms. In spite of all these differences between RF2 and RF3, Table 6.12 shows that the differences between the two groups are not significant, so this suggests that firm age is not a good control variable for the relationship between BSC implementation extent and CA.

The third relationship in RF2 is between IC and BSC implementation extent. Investigating this relationship in both RF2 and RF3 shows that long established firms have a higher path coefficient than young firms. This finding agrees with Youndt et al. (2004) who stated that older firms are associated with higher values of IC. However, the results in Table 6.12 show that the group differences in studying this relationship are not significant. This suggests that firm age is not a good control variable for studying the relationship between IC and BSC implementation extent.

The RF3 investigates six different relationships compared to RF1 and RF3. The first one investigates the relationship between BSC implementation extent and BSC implementation success level. The result in Table 6.11 shows that this relationship is stronger for young firms than long established firms. This might suggest that young firms need to show higher extent of BSC implementation and higher success in BSC implementation than long established firms in order to realize value. This is because long established firms are well established and stable in their achievement. This also might be in line with Hoque and James (2000), who suggested that firms with products at early development stages need BSC implementation more than those with products at late stages of development. Considering the group differences to be significant as presented in Table 6.12, this relationship does not show a significant difference. Therefore, this study cannot consider the firm age in this relationship investigation.

The second relationship suggests that the success in BSC implementation is positively associated with firm CA. The result in Table 6.11 suggests that young firms show a higher result for this relationship than long established firms. The impact of other variables such as IC and BSC implementation extent on CA is consistent with this relationship. This shows that the firm at its early stage is more in developing CA than realizing FP. This opinion is in line with the result of the third relationship in the RF3, which suggests that BSC implementation success level is associated with FP. The result shows that this relation is higher for young firms than long established firms which suggests that young firms are more focused on realizing and generating profit than focusing on CA. The results is also consistent with the main results in Tables 6.6 and 6.8 that suggest that this relationship is fully mediated by CA. The results in Table 6.11 also show that the relationship between BSC implementation success and FP is fully mediated by CA for both young and long established firms. Nevertheless, the result in Table

6.12 shows that the group differences for the two relationships are not significant, so firm age is not an important factor in studying the two relationships.

The last three relationships study the impact of the three success factors (management support, incentive linkage and BSC implementation at different business units of the firm) on the success of BSC implementation. The first proposed that implementing BSC at different Business units of the firm is positively associated with the success in BSC implementation. The path coefficient for this relationship is positive and insignificant for both young and ling established firms. This is due to the level of significance of the main relationship presented in table 6.6. The main relationship path coefficient is 0.089 which small and significant with p-value of 0.019. The weakness of this relationship might have an impact on the group analysis of both young and long established firms. The other two relationships (Management support -> BSC Success and Incentive Link -> BSC Success) are stronger for young firms than for long established firms. This might suggest that the impact management support and incentive link to BSC implementation success is more for young firms. This because the firm at its earlier stage will need to be more management support and incentive link for more successful implementation. However, the differences between the two groups for studying the three relationships are not significant, which suggests that firm age is not a good factor for studying these relationships.

To summarise, whilst there are some differences in the results from the MGA analysis between different research frameworks, the group comparison shows that the differences between all of the relationships in the three research frameworks are not significant except the relationships between IC and both CA and FP. Based on that, this study suggests that firm age is an important factor for studying these relationships as suggested by Youndt et al. (2004).

Table 6.11 : Path coefficient analysis when control for firm age

Proposed relationship	Path coefficient (young)	Path coefficient (long est.)	P-values (young)	P-values (long est.)
First research framework				
H1A: IC => CA	0.709	0.595	0.000	0.000
H1B: CA => FP	0.794	0.834	0.000	0.000
H1C: IC => FP	0.221	0.342	0.000	0.000

Continue table 6.11 : Path coefficient analysis when control for firm age				
Proposed relationship	**Path coeffic. (young)**	**Path coeffic. (long est.)**	**p-values (young)**	**P-values (long est.)**
Second research framework				
H2.1B: BSC Imp -> CA	0.209	0.150	0.000	0.000
H2.2A: BSC Imp -> FP	0.088	0.048	0.004	**0.057**
H1B: CA -> FP	0.694	0.592	0.000	0.000
H2.1A: IC -> BSC Imp	0.555	0.580	0.000	0.000
H1A: IC -> CA	0.665	0.741	0.000	0.000
H1C: IC -> FP	0.178	0.316	0.000	0.000
Third research framework				
H3.1C: BSC Imp -> BSC Level	0.896	0.901	0.000	0.000
H3.3A: BSC Imp -> BSC Success	0.372	0.449	0.000	0.000
H2.1B: BSC Imp -> CA	0.064	0.031	**0.142**	**0.534**
H2.2A: BSC Imp -> FP	-0.013	0.042	**0.757**	**0.301**
H3.1B: BSC Imp -> Incentive Link	0.722	0.753	0.000	0.000
H3.1A: BSC Imp -> Top MGMT support	0.812	0.793	0.000	0.000
H3.2C: BSC Level -> BSC Success	0.054	0.039	**0.373**	**0.548**
H3.4B: BSC Success -> CA	0.106	0.210	0.029	0.000
H3.5A: BSC Success -> FP	0.082	0.059	**0.062**	**0.164**
H1B: CA -> FP	0.577	0.668	0.000	0.000
H2.1A: IC -> BSC Imp	0.561	0.552	0.000	0.000
H1A: IC -> CA	0.737	0.659	0.000	0.000
H1C: IC -> FP	0.318	0.197	0.000	0.000
H3.2B: Incentive Link -> BSC Success	0.365	0.271	0.000	0.000
H3.2A:Top MGMT support ->BSC Success	0.180	0.213	0.023	0.000

Table 6.12 : Path significant differences between different firms ages		
Proposed relationship	**Path Coeffic. (long est.- young firms)**	**p-value (long est. vs young firms)**
First research framework		
H1A: IC => CA	0.114	0.975
H1B: CA => FP	0.040	**0.040**
H1C: IC => FP	0.121	**0.024**
Second research framework		
H2.1B: BSC Imp -> CA	0.058	0.868
H2.2A: BSC Imp -> FP	0.040	0.846
H1B: CA -> FP	0.102	0.957
H2.1A: IC -> BSC Imp	0.025	0.327

Continue table 6.12 : Path significant differences between different firms ages		
Proposed relationship	**Path Coeffic. (long est.- young firms)**	**p-value (long est. vs young firms)**
Continue second research framework		
H1A: IC -> CA	0.075	**0.042**
H1C: IC -> FP	0.138	**0.013**
Third research framework		
H3.1C: BSC Imp -> BSC Level	0.004	0.584
H3.3A: BSC Imp -> BSC Success	0.077	0.770
H2.1B: BSC Imp -> CA	0.033	0.309
H2.2A: BSC Imp -> FP	0.055	0.830
H3.1B: BSC Imp -> Incentive Link	0.030	0.800
H3.1A: BSC Imp -> Top MGMT support	0.019	0.241
H3.2C: BSC Level -> BSC Success	0.016	0.431
H3.4B: BSC Success -> CA	0.104	0.932
H3.5A: BSC Success -> FP	0.023	0.357
H1B: CA -> FP	0.091	0.929
H2.1A: IC -> BSC Imp	0.008	0.436
H1A: IC -> CA	0.078	**0.041**
H1C: IC -> FP	0.121	**0.030**
H3.2B: Incentive Link -> BSC Success	0.094	0.153
H3.2A:Top MGMT support ->BSC Success	0.033	0.626

6.3 Robustness test using secondary data for FP

In the previous sections the study analysed the three frameworks using primary data collected via questionnaire for all research variables, including FP. The purpose of this section is to conduct a robustness test for the main study analysis that involves FP using secondary data. As discussed in Chapter 4, three measures of FP are employed for the purpose, namely ROA, ROE and TSR. Due to the issue of data availability, only data for listed firms can be obtained for the robustness test. Within the sample of this study, only 27 firms are listed on the Muscat Security Market. The three FP measures are therefore calculated for those 27 firms using the financial reports of the financial year 2016.

In total 289 managers participated (i.e. responded to the questionnaire survey) from the 27 listed firms. The number of managers participated varies from a minimum of 6 and maximum of 15 managers per firm. The three calculated performance measures (i.e. ROA, ROE and TSR) are inserted into the dataset, which will replace the ten performance measures collected from the questionnaire survey.[20]

Whilst the 27 firms represent 22% of the 119 listed firms in Muscat Security Market, they are from three industries only, i.e. telecommunication, banking and manufacturing. It is therefore important to note that the results of the robustness test need to be interpreted within context, i.e. the small number of companies included in the test, and cannot be generalized to represent all industries and firms that are listed in Muscat Security Market.

Table 6.13 provides the descriptive statistics for the three performance measures.

Table 6.13: Descriptive statistics for calculated FP

Measured variables	Min.	Max.	Mean	Std. deviation
ROA	-0.033	0.261	0.122	0.091
ROE	-0.014	0.244	0.127	0.083
TSR	-0.004	0.123	0.080	0.061

The minimum and the maximum value of the measures shows low profitability of the firms. The reason for that is the high cost of borrowing (Rao, 2007) and sharp decline of international oil prices (Gupta, 2016) that affected most of listed firms in Muscat Security Market. The negative value indicate negative FP for some of the firms. Due to that most of the firms reduced the number of staff in order to reduce cost and enhance profitability[21].

It can be seen from Table 6.13 that the three variables have standard deviation values close to the mean, suggesting that there is less variation in FP among the sampled firms. This also indicate the data is not normally distributed (Pallant, 2010). However, the normality of data distribution is not an issue for the PLS-SEM analysis used in this study, and thus not a concern.

[20] It is worthwhile noting here that the three calculated performance measures, based on secondary data, will be the same for all participants that are from the same firm.

[21] http://www.dw.com/en/continuing-low-oil-prices-cause-crisis-in-oman/a-18584787

The measurement and the structural model evaluation for the three research frameworks using the FP drawn from secondary data are provided in the following section.

6.3.1 Measurement model evaluation

As discussed in section 6.2.1 earlier, the measurement model evaluation for formative constructs are conducted in two stages, i.e. the test of multi-collinearity between indicators and the outer weights analysis, which are discussed separately in the following sections.

6.3.1.1 Multi-collinearity between indicators

As discussed in the Research Methodology chapter, the multi-collinearity issue between indicators is tested using tolerance and VIF values. The rule of thumb is that VIFs that are less than 5 and tolerance greater than 0.2 suggest multi-collinearity not to be a problem (Hair, 2010). The tests are conducted separately for the first and the second stage of the second order construct analysis. Test results suggest that multi-collinearity is not a problem in this study, as can be seen in the VIF and tolerance values presented in

Tables A.3.4 and A.3.5 in the Appendix that all VIF values are below 5 and tolerance values are above 0.2.

6.3.1.2 The outer weights

The outer weight test will be conducted separately for each research framework and for each stage of the second order construct evaluation. If all indicators are found to be relevant and hold significant weight on measuring the proposed construct, it can be concluded that the measured model (construct + indicators) is suitable for structural model evaluation. However, if the outer weight is not significant for any of the indicators, then it is recommended to use outer loading (≥ 0.5) to decide on whether or not to retain an indicator. If the outer loading is less than 0.5, the significance of the loading should then be considered (Hair Jr et al., 2016). Finally, the indicator should be deleted from its construct if none of the above criteria are met. Table A.3.6 in the Appendix provides the results for outer weights and loadings as well as their significances for the three research frameworks proposed in this study in the first order analysis, and Table A.3.7 provides the bootstrapping results for the second order analysis.

The results suggest that there are many insignificant outer weights presented by each of the three research frameworks. The first-order construct evaluation stage shows that RF1, RF2 and RF3 have 20 out of 53, 21 out of 58 and 22 out of 70 insignificant outer weights respectively. The second stage shows that the three research frameworks have 8 out of 20, 9 out of 25 and 12 out of 37 insignificant outer weights respectively. Before deleting any of the indicators with insignificant outer weights, the outer loadings and their significance are considered (Hair Jr et al., 2016). The results show that all outer loadings for the insignificant outer weight indicators found in the three research frameworks are significant with loading values above the threshold of 0.5 suggested in Hair Jr et al. (2016). This suggests the importance of these indicators for contributing to the contents of their constructs and that all of the indicators can be retained for further analysis of the structural models evaluation for the three research frameworks.

6.3.2 Structural model evaluation

The evaluation of measurement models is conducted in the previous section and the results suggest that all of the indicators used in this research are relevant for capturing the content of their constructs. The previous analysis also suggests the suitability of the measurement models for the second stage of PLS-SEM. This section discusses the evaluation of the structural models. The structural model evaluation steps will be conducted separately for each one of the three research frameworks proposed in this study.

The criteria used for the assessment of the structural model for PLS-SEM using formative models are the multi-collinearity between different constructs, path coefficient (β) and coefficient of determination (R^2) (Henseler et al., 2014). Path coefficients are standardized versions of linear regression weights that are used to examine the possible causal relationships between research variables in the SEM approach. The coefficient of determination indicates the percentage of variation in the dependent variable that is predictable from the independent variable. Based on the percentage of the total variation of outcomes explained, it also measures how well the observed indicators are replicated by the model.

Next sections are testing the multi-collinearity between constructs, path coefficients and coefficients of determination for all the proposed relationships in each of the three research frameworks.

6.3.2.1 Multi-collinearity between latent variables

Multi-collinearity between variables shows that there is a linear relationship between two or more exogenous or independent variables (Tabachnick and Fidell, 2007). Table 6.14 below presents the multi-collinearity and the path coefficients for all the research frameworks in this study.

The analysis shows that all the constructs used in RF1, RF2 and RF3 are exogenous because all constructs are formative and are explaining their indicators. Therefore, the multi-collinearity test should be applied to all the constructs within the three research frameworks. This test suggests that the multi-collinearity between each set of predictor constructs[22] should be examined separately. The results presented in Table 6.14 suggest that multi-collinearity for all the relationships within the three research framework is not an issue for concern with all tolerance values >0.2 and all VIF values <5. Therefore, all the research variables are suitable for determining the path coefficients and coefficients of determination for all the proposed relationships.

Table 6.14: Multi-collinearity between predictor constructs

Predictor construct	Tolerance	VIF
First research framework		
IC => CA	1.000	1.000
CA => FP	0.367	2.724
IC => FP	0.367	2.724
Second research framework		
BSC Imp -> CA	0.678	1.475
BSC Imp -> FP	0.526	1.900
CA -> FP	0.268	3.729
IC -> BSC Imp	1.000	1.000
IC -> CA	0.678	1.475
IC -> FP	0.345	2.897

[22] Predictor constructs are any two linked together where one construct predict the other.

Continue Table 6.14: Multi-collinearity between predictor constructs		
Predictor construct	**Tolerance**	**VIF**
Third research framework		
BSC Imp -> BSC Level	1.000	1.000
BSC Imp -> BSC Success	0.239	4.186
BSC Imp -> CA	0.375	2.669
BSC Imp -> FP	0.365	2.743
BSC Imp -> Incentive Link	1.000	1.000
BSC Imp -> Top MGMT support	1.000	1.000
BSC Level -> BSC Success	0.246	4.072
BSC Success -> CA	0.401	2.491
BSC Success -> FP	0.358	2.792
CA -> FP	0.236	4.230
IC -> BSC Imp	1.000	1.000
IC -> CA	0.627	1.595
IC -> FP	0.323	3.092
Incentive Link -> BSC Success	0.476	2.103
Top MGMT support ->BSC Success	0.457	2.188

6.3.2.2 Path coefficients

The path coefficient represents the strength or the weakness of the relationship between different variables. Table 6.15 analyses the relationships between all of the variables presented in the three research frameworks. It also provides both the path coefficients and significance test results for all relationships. The path coefficients for the same variable differ from one framework to another, depending on the types and number of variables included in the framework. Any path coefficient that holds p-values below 0.05 is considered to be significant and provides support for the proposed relationship under investigation. Overall, all hypotheses are supported and the results are consistent with the path coefficients for the main study results presented in section 6.2.2.2, except the relationships of the variables with FP (i.e. in relation to hypotheses of H1C and H2.2A).

The hypothesis H1C proposing that IC is positively associated with FP. The path coefficients presented in Table 6.15 for this relationship in the three research frameworks are insignificant. This relationship is affected by the mediation impact of CA in RF1 and the mediation impact of CA and BSC implementation extent in RF2 and RF3. Due to the mediation impact the path coefficient of this relationship is reduced from 0.446, 0.447 and 0.443 to 0.181, 0.046 and 0.077 for RF1, RF2 and RF3 respectively.

The hypothesis H2.2A is proposing that BSC implementing extent is associated with FP. This relationship is presented in RF2 and RF3. The main study analysis presented in section 6.2.2.2 shows that this relationship is significant for RF2 and insignificant for RF3. However, the analysis in Table 6.15 shows that the path coefficients for this relationship is insignificant in both RF2 and RF3. The results suggest that this relationship is mediated by CA. Hence, the path coefficient is reduced from 0.414[23] to 0.133 and 0.121 for RF2 and RF3 respectively.

The findings discussed above are consistent with the main study findings except for hypotheses H1C and H2.2A which are mainly affected by mediating impact, which will be discussed further in section 6.3.2.4 below.

Table 6.15: Hypothesis testing

Hypotheses proposed	**Path Coefficient β**	**p value**	**Significance**	**Support**
First Framework				
H1A: IC => CA	0.796	0.000	***	**Supported**
H1B: CA => FP	0.328	0.002	***	**Supported**
H1C: IC => FP	**0.181**	**0.085**	**Insignificant**	**Supported but affected by mediator**
Second research Framework				
H2.1B: BSC Imp -> CA	0.338	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	**0.133**	**0.106**	**Insignificant**	**Supported but affected by mediator**
H1B: CA -> FP	0.349	0.002	***	**Supported**
H2.1A: IC -> BSC Imp	0.568	0.000	***	**Supported**
H1A: IC -> CA	0.617	0.000	***	**Supported**
H1C: IC -> FP	**0.046**	**0.658**	**Insignificant**	**Supported but affected by mediator**
Third research Framework				
H3.1C: BSC Imp -> BSC Level	0.854	0.000	***	**Supported**

[23] The path coefficients are significant without the mediator impact which provide strong support for hypothesis H2.2A.

Continue Table 6.15: Hypothesis testing				
Hypotheses proposed	**Path Coefficient β**	**p value**	**Significance**	**Support**
Continue third research Framework				
H3.4A: BSC Imp -> BSC Success	0.351	0.000	***	**Supported**
H2.1B: BSC Imp -> CA	0.132	0.013	**	**Supported**
H2.2A: BSC Imp -> FP	**0.121**	**0.211**	**Insignificant**	**Supported but affected by mediator**
H3.1B: BSC Imp -> Incentive Link	0.679	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.684	0.000	***	**Supported**
H3.2C: BSC Level -> BSC Success	0.202	0.025	**	**Supported**
H3.4B: BSC Success -> CA	0.267	0.000	***	**Supported**
H3.5A: BSC Success -> FP	**0.021**	**0.827**	**Insignificant**	**Supported but affected by mediator**
H1B: CA -> FP	0.317	0.004	***	**Supported**
H2.1A: IC -> BSC Imp	0.591	0.000	***	**Supported**
H1A: IC -> CA	0.595	0.000	***	**Supported**
H1C: IC -> FP	**0.077**	**0.493**	**Insignificant**	**Supported but affected by mediator**
H3.2B: Incentive Link -> BSC Success	0.287	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.229	0.012	**	**Supported**

6.3.2.3 Coefficients of determination

The coefficient of determination explains the percentage of variation in dependent variable(s) explained by the independent variable. When the model provides p-values more than 0.95 confidence interval or less than 0.05, then the structural model is considered to be a good fit for the data. The R^2 of 0.10 or more is considered substantial (Falk and Miller,1992). However, the acceptable values for R^2 in the field of management accounting is between 0.17 and 0.42 (Vandenbosch, 1999, Chenhall, 2005). Results for the R^2 values and their significance levels for all dependent variables within the three research frameworks are presented in Table 6.16.

The RF1 has two dependent variables CA and FP. The CA depends on IC and FP depends on both IC and CA. The R^2s of CA and FP are 0.633 and 0.235 respectively, suggesting that the independent variable IC explains 63.3% of the variation in CA, and the independent variables of IC and CA explain 23.5% of the variation in FP. The t-statistics and p-values for both R^2 values are significant at 1% level, suggesting that the structural model in RF1 has a good fit with the data collected.

Table 6.16: R Square values for the three research frameworks				
Constructs	**R^2**	**t-Statistics**	**p-values**	**Significant**
First research framework				
CA	0.633	16.279	0.000	***
FP	0.235	4.365	0.000	***
Second research framework				
BSC Imp	0.322	6.428	0.000	***
CA	0.732	24.269	0.000	***
FP	0.238	4.184	0.000	***
Third research framework				
BSC Imp	0.350	6.568	0.000	***
BSC Level	0.730	20.582	0.000	***
BSC Success	0.660	14.394	0.000	***
CA	0.764	30.024	0.000	***
FP	0.240	4.159	0.000	***
Incentive Link	0.461	7.486	0.000	***
MGMT support	0.467	8.659	0.000	***

For RF2, coefficients of determination R^2 are calculated for the dependent variables of BSC implementation extent, CA and FP. The R^2 values of the BSC implementation extent is 0.322, suggesting that IC explains 32.2% of the variation in the BSC implementation extent. The R^2 value for CA is 0.732, implying that IC and BSC implementation extent explain 73.2% of the variation in the firm' CA. The lowest R^2 of 0.238 is presented by FP, implying that IC, BSC implementation extent and CA explain 23.8% of the variation in the dependent variable FP. The t-statistics and p-value for all R^2 values are below the 0.05 confidence interval, suggesting that the structural model provided by this research framework fits the collected data well.

For RF3, the R^2 is calculated for the dependent variables, i.e. BSC implementation extent, BSC implementation success, management support, incentive link, BSC level, CA and FP. The results show the R^2 value for BSC implementation extent is 0.350, which indicates that the independent variable of

IC explains 35% of the variation in BSC implementation extent. The R^2 value for the BSC implementation success is 0.660, which means that the independent variables of BSC implementation extent, BSC implementation at different levels of the firm, the incentive link to BSC implementation and management support to BSC implementation explain 66% of the variation in the BSC implementation success. The result also shows that the change in BSC implementation extent explain 46.7% of the change in management support to BSC implementation, 46.1% of the change in incentive link to BSC implementation and 73% of the change in BSC implementation at different levels of the firm. The CA shows R^2 value of 0.764, which indicate that 76.4% of the variation in CA is explained by the change in BSC implementation extent and BSC implementation success. The R^2 of FP is 0.240, which explains that the independent variables of IC, BSC implementation extent, BSC implementation success and CA explain 24% of the variation in the dependent variable FP. The t-statistics and p-value for all R^2 values are below 0.01 confidence interval, which suggest that the structural model provided by RF3 fits the collected data well.

6.3.2.4 The mediator impact evaluation

The mediator evaluation for all the relationships presented by Table 6.17 for the three research frameworks are consistent with the main study findings presented in section 6.2.2.4, except for the hypotheses H1D and H2.3A.

Hypothesis H1D proposes that the relationship between IC and FP is indirect through the mediation impact of CA. This is supported by the results given in Table 6.15, which show that the relationships between IC and CA, and CA and FP are significant, whilst the direct relationship between IC and FP is insignificant. The path coefficient for the relationship is reduced from 0.446, 0.447and 0.443 to 0.181, 0.046 and 0.077 in RF1, RF2 and RF3 respectively by including the mediator of CA. This indicates that the CA is fully mediating the relationship between IC and FP in the three research frameworks. This finding provides better support for the hypothesis than Kamukama et al. (2011) who found that CA partially mediates the IC and FP relationship.

Hypothesis H2.3A, presented in RF2 and RF3, suggests that the relationship between BSC implementation extent and FP is mediated by CA. All indirect relationships in Table 6.15 are significant while the direct relationships in Table 6.17 are insignificant. This indicates that CA is fully mediating the relationship between BSC implementation extent and FP.

The findings for hypotheses H1D and H2.3A suggest that CA is a very strong mediator for the relationships between IC and FP, and BSC implementation and FP.

Table 6.17: Mediator test for the three research frameworks

The effect	Path Coefficient	t-Statistics	p-value	Significant if t-statistics ≥ 1.96 and P-value < 0.05
First research framework				
First Mediator: (CA) H1D				
Direct affect between IC and FP without mediator	0.446	7.759	0.000	Significant
Direct affect between IC and FP with mediator	0.181	1.728	0.085	**insignificant full mediator**
Second research framework				
First Mediator: (BSC Implementation + CA) H1D & H2.2B				
Direct affect between IC and FP without mediator	0.447	8.317	0.000	Significant
Direct affect between IC and FP with BSC Imp. as mediator	0.279	3.256	0.001	**Significant Partial mediator**
Direct affect between IC and FP with CA as mediator	0.075	0.657	0.511	**insignificant full mediator**
Direct affect between IC and FP with both mediators	0.046	0.449	0.654	**insignificant full mediator**
Second Mediator: (BSC Implementation) H2.1C				
Direct affect between IC and CA without mediator	0.816	33.948	0.000	Significant
Direct affect between IC and CA with mediator	0.617	12.353	0.000	**Significant Partial mediator**
Third Mediator: (CA) H2.3A				
Direct affect between BSC Implementation and FP without mediator	0.414	8.379	0.000	Significant
Direct affect between BSC Implementation and FP with mediator	0.133	1.618	0.106	**insignificant full mediator**

Continue Table 6.17: Mediator test for the three research frameworks				
The effect	**Path Coeffi-cient**	**t-Statistics**	**p-value**	**Significant if t-statistics ≥ 1.96 and P-value < 0.05**
Third research framework				
First Mediator: (BSC Implementation + CA) H1D & H2.2B				
Direct affect between IC and FP without mediator	0.443	8.003	0.000	Significant
Direct affect between IC and FP with BSC Imp. extent as mediator	0.299	3.367	0.001	**Significant Partial mediator**
Direct affect between IC and FP with CA as mediator	0.087	0.733	0.464	**insignificant full mediator**
Direct affect between IC and FP with the two mediators	0.077	0.687	0.493	**insignificant full mediator**
Second Mediator: (BSC Imp) H2.1C				
Direct affect between IC and CA without mediator	0.828	36.965	0.000	Significant
Direct affect between IC and CA with mediator	0.595	13.643	0.000	**Significant Partial mediator**
Third Mediator: (BSC Success) H3.4C				
Direct affect between BSC Imp. extent and CA without mediator	0.698	22.157	0.000	Significant
Direct affect between BSC Imp. extent and CA with mediator	0.132	2.484	0.013	**Significant Partial mediator**
Forth Mediator: (CA) H3.5B				
Direct affect between BSC success and FP without mediator	0.399	7.394	0.000	Significant
Direct affect between BSC success and FP with mediator	0.021	0.219	0.827	**insignificant full mediator**
Fifth Mediator: (Top MGMT support + Incentive Link + BSC Imp. Level) H3.3A, H3.3B & H3.3C				
Direct affect between BSC Implementation extent and BSC success without mediator	0.775	25.289	0.000	Significant
Direct affect between BSC Implementation extent and BSC success with MGMT support as mediator	0.642	11.233	0.000	**Significant Partial mediator**
Direct affect between BSC Implementation extent and BSC success with Incentive link as mediator	0.529	8.382	0.000	**Significant Partial mediator**
Direct affect between BSC Implementation extent and BSC success with BSC Level as mediator	0.505	5.588	0.000	**Significant Partial mediator**
Direct affect between BSC Imp. extent and BSC success with the three mediator	0.351	3.788	0.000	**Significant Partial mediator**

Continue Table 6.17: Mediator test for the three research frameworks				
The effect	**Path Coeffi-cient**	**t-Statistics**	**p-value**	**Significant if t-statistics ≥ 1.96 and P-value < 0.05**
Continue third research framework				
Sixth Mediator: (BSC Success + CA) H2.3A & H3.4D				
Direct affect between BSC Imp. extent and FP without mediator	0.414	9.692	0.000	Significant
Direct affect between BSC Imp. Extent and FP with BSC success as mediator	0.279	3.233	0.001	**Significant Partial mediator**
Direct affect between BSC Imp. extent and FP with CA as mediator	0.137	1.561	0.119	**insignificant full mediator**
Direct affect between BSC Imp. Extent and FP with mediation impact of BSC success and CA	0.121	1.253	0.211	**insignificant full mediator**

6.4 Summary

This chapter describes the analysis for both measurement and structural models for the three proposed research frameworks. The analysis conducted for both the main study and the robustness test. Since all the constructs in the research frameworks are formative, the measurement model evaluation was conducted using two tests: multi-collinearity and outer weight. The collinearity test indicates the absence of the multi-collinearity problem because both tolerance levels and the value of VIFs are within the recommended range. The outer weight results show that not all outer weights for all indicators are significant. Therefore, the outer loadings are used to decide the importance of the indicators in capturing the contents of their constructs. The results show that all indicators' outer loadings are above the standard requirement and are significant. Therefore, all indicators are included for evaluating the structural models designed.

The structural model evaluation is conducted using three tests: (i) multi-collinearity between latent variables, (ii) path coefficients β and (iii) coefficients of determination R2. The result shows that the multi-collinearity problem between the latent variables of the research framework is not an issue, indicating that the latent variables are suitable for the path coefficient and coefficient of determination analysis. The path coefficients β values and significance test for all the proposed relationships are positive and highly significant, implying that all the proposed hypotheses for this research framework are supported. The coefficients of determination of all dependent variables in all the three research frameworks are within the recommended standard and explain perfectly the impact of all the independent. This indicating that the structural model provides a good fit for our data.

The mediation impact relationships suggested by the three research frameworks for the main study are all supported. All the mediation impact relationships show partial mediation, except the mediating impact of both CA and the success level of BSC implementation on the relationship between BSC implementation level and FP, and the mediation impact of CA on the relationship between the success of BSC implementation and FP, which provide full mediation. The robustness test showed that CA is fully mediating the relationship between IC and FP and the relationship between BSC implementation extent and FP.

Under the structural model evaluation, this study also investigated the mediating impact of three success factors (i.e. management support, incentive linkage and BSC implementation at different levels of the firms) on the relationship between BSC implementation extent and the success of BSC implementation. This study suggests that the three factors partially mediate the relationship between BSC implementation extent and the success of BSC implementation. Therefore, the relationships proposed by hypotheses H3.3A, H3.3B and H3.3C are supported.

There is another test conducted to control for firm size and age on all the relationships proposed in the three research frameworks. The findings indicate that firm size is not a good control variable for all the relationships represented by the three research frameworks which differ from the suggestion of both Hoque and James (2000) and Youndt et al. (2004). Firm age is found to have an impact on the relationships between IC and both CA and FP, which is in line with the suggestion made by Youndt et al. (2004).

CHAPTER SEVEN: QUALITATIVE DATA ANALYSIS

7.1 Introduction

The previous chapter provides the quantitative data analysis, using (PLS-SEM) via SmartPLS. The findings support the hypotheses proposed. In order to further support the findings from the questionnaire survey, this chapter provides analysis of the semi-structured interviews.

The questionnaire participants were asked whether they are interested in participating in an interview to discuss the issues raised in the questionnaire further. Though 35 respondents expressed their willingness to participate in the interview, only 32 of them were able complete it. Table 7.1 provides a summary of the interview participants in terms of the industry within which the interviewee's company operates and their position. It shows that, out of 32 participants, four are from telecommunication firms; three are from banks; nine are from services firms; seven from oil and gas firms; six are from manufacturing firms; and three are from construction firm.

The aim of the interviews is to support the findings from the questionnaire, not to explore or provide additional findings for an issue that was not investigated before. The interview results were analysed using the thematic approach, in that the interview transcripts are divided into themes based on the questions asked. Fifteen themes are investigated: (i) the most important IC to firms, (ii) impact of IC on CA of firms (iii) impact of IC on FP, (iv) impact of CA on FP, (v) alignment of BSC to the company operation and strategic plan, (vi) impact of BSC implementation on firm CA, (vii) impact of BSC implementation on FP, (viii) impact of IC on BSC implementation, (ix) impact of BSC implementation level on the success of BSC implementation, (x) impact of management support on the success in BSC implementation, (xi) impact of linking incentive plans to BSC implementation on the success in BSC implementation, (xii) impact of implementing BSC at different levels of the firm on the success in BSC implementation, (xiii) other success factors for BSC implementation, (xiv) impact of BSC implementation success on firm CA, and (xv) impact of BSC implementation success on FP. Each of the above themes will be discussed separately based on the answers given by the interviewees.

Table 7.1: Details of interview participants									
Industry		Firm code	Interviewee position	Duration of interview	Industry		Firm code	Interviewee position	Duration of interview
1	Telecommunication	TEL1	Operation manager	27:27 minutes	17	Oil & Gas	OIL1	Drilling manager	20:35 minutes
2	Telecommunication	TEL1	HR manager	29:08 minutes	18	Oil & Gas	OIL2	Project manager	29:49 minutes
3	Telecommunication	TEL2	Marketing manager	16:06 minutes	19	Oil & Gas	OIL2	Technical manager	30:24 minutes
4	Telecommunication	TEL2	Entrepreneurship manager	26:20 minutes	20	Oil & Gas	OIL2	HR manager	25:13 minutes
5	Banking	BANK1	HR manager	28:51 minutes	21	Oil & Gas	OIL3	CEO	19:51minutes
6	Banking	BANK1	Marketing manager	22:32 minutes	22	Oil & Gas	OIL4	Marketing manager	46:18 minutes
7	Banking	BANK2	Loans management manager	18:45 minutes	23	Oil & Gas	OIL4	Finance manager	22:36 minutes
8	Service	SERV1	HR manager	1:09:57 hours	24	Manufacturing	MAN1	CEO	29:50 minutes
9	Service	SERV1	Operation manager	20:12 minutes	25	Manufacturing	MAN1	Marketing manager	27:11 minutes
10	Service	SERV2	CEO	24:11 minutes	26	Manufacturing	MAN2	CFO manager	27:44 minutes
11	Service	SERV3	HR manager	21:56 minutes	27	Manufacturing	MAN2	Marketing manager	16:18 minutes
12	Service	SERV4	Marketing manager	27:02 minutes	28	Manufacturing	MAN3	HR manager	17:20 minutes
13	Service	SERV5	Finance manager	20:26 minutes	29	Manufacturing	MAN3	Sales Manager	19:40 minutes
14	Service	SERV6	CEO	42:20 minutes	30	Construction	CONS1	CEO	33:56 minutes
15	Service	SERV6	Operation manager	33:26 minutes	31	Construction	CONS1	Marketing manager	14:20 minutes
16	Service	SERV6	Marketing manager	23:05 minutes	32	Construction	CONS1	HR manager	12:18 minutes

7.2 The most important IC to firms

The interviews with the managers from different companies and industries revealed important information about IC in the Omani market. Axtle-Ortiz (2013) argues that geographical region, industrial sector and firm size are statistically significant factors that influence the weighting of IC. The findings of the interview survey is in line with Axtle-Ortiz (2013) when it comes to the industrial sector but it was not investigated in relation to geographical region and firm size. The managers in different industries revealed deferent IC elements as the most important elements for their organization, and obviously each manager indicated importance according to his/her current responsibilities. All the industries give more importance to the staff development and consider them the base for all IC elements. So they suggest investing in human capital in order to be successful in other IC resource investment. The analysis below presents the interview responses from the various industries.

7.2.1 Telecommunication industry

Four managers from two telecommunication industries have agreed to provide responses. In the TEL1 firm the interview was conducted with the managers in operation and HR, whereas in TEL2 managers responsible for marketing and entrepreneurship responded for the interview schedule. Since both the firms are large and located at the same city, the possibility for geographical differences is insignificant. Though these firms show similar focus in IC, the different position or profile of the participants made them to focus on the elements that are most related to his/her position in the firm. All of them give importance to the human capital as it helps in running the businesses' daily operations and enhances the firm capabilities in other IC areas. The discussion below depicts the picture of the respondents' view on the importance of IC on their firm.

The Entrepreneurship manager at TEL2 firm stressed the importance of human capital because the kind of skills required to run firm activities are only embedded in people. The manager has revealed that the firm is investing in people knowledge enhancement by providing training to enhance their skills, experience and capabilities. He also touched on the importance of social responsibility and brand awareness activities as parts of the firm investment in IC. He stated the following:

'I would say there are many; the most important to any organization it is people, and to my organization it is not any difference. So, it is people knowledge that they have, the training we provide, the skills, the experience they gain and the capabilities they build by the time. So there will be always an investment through staff development and there will be an incubation program or entrepreneur program the company does to provide the best capabilities in the market. We also have social responsibility toward the society in order to build our goodwill and we are involved in different programs such as the one conducted in Ramadhan to provide Iftar for people that actually play a big role in strengthening or positioning the company brand; so all these are part of our investment in IC.'

The marketing manager at TEL2 firm gave more weight to the firm brand and reputation but then argued that the brand and the reputation cannot be built without having qualified staff. He also considers the importance of customer satisfaction, technology and the customer database. He explains:

'We are more concerned about our brand and our reputation in the market, so the company's first thought is to get the qualified staff from the market and invest in them. The staff are the mirror from which the customers can see the company image, so if the staff reflected a good picture about the company the customer will be back for more business, and the customer will run away if one single mistake is made by unqualified staff. Also to be ready to serve our customer well we provide them with the latest technology in the telecommunication industry and develop a rich customer database from which we can update our customers with our new services and products.'

The operation manager at the TEL1 firm shows his focus as part of his job title. The operation of the telecommunication service is more about producing good products and services for the customers. This requires the focus in the telecommunication system and what is required to run them effectively. So he highlighted the importance of the telecommunication system and the staff to run the operation smoothly:

'The most important IC for our company is to build our telecommunication systems to cope with the latest innovations in the field. Of course the system cannot work as a standalone, and for sure we need good people with good skills to manage the system and introduce it to the customers. So we have a system, good people and loyal customers'.

Finally the human resource manager of the TEL1 firm's main focus was on human capital and he pointed out the impact of human resource investment on other IC elements like brand, technology and customers. His statement is as follows:

'Our department is mostly concerned about the staff. We look after staff development, training needs, motivation and satisfaction. The human capital in any company is the driver for any change, so they should be equipped with all the required skills for the telecommunication industry, because at the end they are the one who produce the success not the brand, not the technology and not even the customers because all come with the good staff.'

7.2.2 Banking Industries

The banking industry focuses more on their customers and the various financial services they provide. They look for the customers who need credit and those with money who want to secure it or to invest their money in order to gain income. Hence, the banking industry would like to maintain a good rapport with customers, creditors, debtors and investors.

The human resource manager at BANK1 stresses the importance of IC resources. He argues that the bank gives more priority to human capital, so they spend a lot of money on staff development. He also believes that their spending on staff development will result in better customer service and better utilization of resources:

'The company gives focus to many areas of IC, but we in this bank give more attention to the staff development area. We pay lots of money to prepare them to do all sort of jobs needed whether it is technical or administration type of job, and all have our whole attentions. So we provide them proper training, we send them abroad to gain new skills and we evaluate them and assess their further need if required. All this will be reflected in proper customer service and good utilization of resources.'

The marketing manager at BANK1 also considers the bank brand and reputation as important IC for their type of industry. So, he argues that in order to keep the brand and reputation level, the bank has to have good security systems against hacking. He also opines that the strong security system will make the customer more loyal to the bank services. He explains the following:

'The brand, the image and reputation of the bank are very important IC to any financial institution. To keep the image of the bank up, you should not have any safety faults because one incident can damage all your investments in building image and reputation for very long time. For example, there was an incident that occurred with one of the most successful banks in Oman where hackers broke the security of the online banking system and stole many of the customers' accounts. The bank took

years and years to recover from this impact because many of their customers left to use other finance institutions'.

Although the loans management manager at BANK2 mostly deals with loans and collections, he believes that staff knowledge and skills are important for job success. Failing to provide the customer with the right knowledge about the banking system might result in customer loss to other banks. He said the following:

'The loans department deals more with money, but it requires human knowledge that tells the borrower exactly what he or she is supposed to get and what to pay after the end of the borrowing periods. You have to be honest with your customer from the beginning; otherwise the customer will go to a more honest person in another bank, which means you lose your customer. So people have to go through different training to do this job."

7.2.3 Service industry

The service industry is more concerned about providing the right services at the right time. So, their main focus is in staff recruitment and development in order to provide the expected service by the customers. This type of industry also focuses on brand awareness, firm reputation, CSR activities, customer relations and service quality. For example, the CEO at SERV2 firm said the following:

'Yes we do have such a type of capital and that is represented by our reputation in the country, the human skills, our participation in the growth of the country and our CSR activities within the country. Another important element is our brand where the company spends lots of money to market our brand and we do participate in international conferences to market our brand.'

Another example is provided by the finance manager at SERV5. He argues that by investing in IC such as staff recruitment and development, other parts of IC will be enhanced. In that, the staff will become more loyal to the firm, so there will be less staff turnover and accordingly that will reduce the firm expenses on recruitment and training. He said that the following:

'We in this department of the firm focus on managing the financial resources. However, IC is one of our main focuses. We understand that if we invest more on these valuable resources the company will become profitable. For example, spending more on staff training or recruiting the most capable staff in the market make the staff loyal to the firm. Loyal staff will spend more time working for the firm and this reduce the recruitment expenses as well as training costs and this make the firm profitable.'

The HR manager at SERV3 recognizes the importance of IC in building the firm CA and FP. He says that the most important capital for his firm are human capital and hence the various process involved in obtaining human capital such as recruitment, selecting capable staff and providing training for those who require also very essential for the firm. He believes that the firm investment on human capital will result in creation of other IC elements such as better customer service that will build the firm reputation. His views are as follows:

> *‘Our company gives high priority to all IC resources due to their importance in maintaining the firm CA and enhancing the firm profitability. The most important IC and that take most focus of the company is human capital or staff. The staff are the leaders, the managers and service staff. The company spends lots of money in recruiting the capable staff and provide training programs and education and come under IC umbrella. These expenses are paid back in the shape of good service to the customer, so there is a good company image.’*

The marketing manager at SERV4 was direct and to the point. He listed the most important IC elements for his firm by saying the following:

> *‘There are many IC resources important to this company. We give more value to brand awareness, customer relations, staff training and development, staff motivations, service quality etc.’*

7.2.4 Oil industry

Like all other industries this industry is rich with many important elements of IC. The interviewees from this industry give weight to some important elements of IC. They refer to IC elements such as human capital (staff development), technical patents, technology and processes, procedures, standards, specification, practices, relations with customer and relations with different stakeholders.

For example, Drilling manager for OIL1 Company said the following:

> *‘My company has IC and actually a lot compared to our industry and I think one of the most important values is for the technical patents, technologies and processes. The human capital value is even bigger than all patents and it is really the key for this company and it is the most valuable among all the IC.’*

He believes that technical patents, technologies and processes are the important IC. However, he considers the human capital as the most important IC of a firm.

The project manager for OIL2 firm considered other elements such as procedures, standards, specifications and practices as IC compared to the Drilling manager at OIL1. He also believes on the importance of staff development as an important element of IC, so he said the following:

> *'We have different intellectual capital in the sense of developing the company procedures, standards, specification, practices and also developing the people in order to be ready for all operation phases of all the company projects.'*

The HR manager at OIL2 firm agrees with the above in considering the human capital as the key IC for the firm. He also highlighted the importance of human capital in building other elements of IC such as enhancing the good relations with stakeholders and customers. He said the following:

> *'Yes, we have IC and currently at the current stage of the company the human resources are the key IC, so the staff skills have to be enhanced in order to face different business requirements such as dealing with different stakeholders, dealing with customers, and dealing with daily business operations and to get them to that point they need training to enhance their knowledge.'*

7.2.5 Manufacturing industry

Manufacturing industry mainly focuses on production activity. These types of industries invest considerable amounts in different elements of IC. The interviewees from this industry focused on the IC elements such as product quality, firm image or reputation, brand, time management, production cost reduction, customer satisfaction, customer safety, CSR, staff selection, staff development, staff motivation, distribution channels and relations with suppliers.

For example, The CEO at MAN1 firm considers the importance of product quality as the most important IC for the firm. He believes that providing a quality product in the market will result in better firm image that will at the same time enhance the firm brand awareness. However, he considers the staff as the one behind producing quality products. He also argues that recruiting good staff can result in better production time management, reducing production cost and therefore leading to better customer satisfaction. His firm also pays attention to staff and customer safety during production as an important IC for their business. He explains that the following:

> *'Our firm focuses on some important sections of IC. The main [section] is product quality that shapes our brand and image in the market. However, the staff are the most important one. We consider our staff the source of all good or bad investments in IC. That is because the good staff produces quality products, have good production time management, and is good in reducing production cost; that will result in better customer satisfaction. We also consider staff and users' safety as well as making sure that our production lines do not harm any of the environment elements.'*

The marketing manager at MAN2 agreed with the above statement in considering the product quality as the most important IC for the firm. However, his firm focuses on some other IC elements such as distribution channels, customer relations as well as relations with suppliers. He said the following:

> *'We are part of the production or the manufacturing industry. Our main objectives is to produce quality products with reasonable prices, so we give more focus to product quality. When we talk about IC in this company we think about product quality, well-known brands, distribution channels and customer relations. We also give priority to our relations with suppliers because without their cooperation we will not be able to meet the demand on time. They provide us materials on credit, so we pay them after selling the products.'*

However, the HR manager at MAN 3 believes that building a strong brand is the most important IC for their firm. He argues that the firm can strengthen its brand by investing in staff development such as selecting the right staff, providing them with training and motivation. Like the above two interviewees, he believes that satisfied staff are the source of other IC elements such as product quality, good firm image and brand. So he explains that by saying the following:

> *'The IC is our company focus. Our mission is to develop the best brand in the market. We believe that building our people's capabilities is the way toward achieving our target of building our brand. So we select the right staff, provide them with the right training and motivate them. If our people are satisfied they definitely will work hard and produce the right product that gives a good image about our brand and our company. By achieving that our market share will be widen.'*

7.2.6 Construction industry

The construction industry is almost similar to the manufacturing industry in producing final products to the customers. They consider firm image, work quality, selecting the right architects, staff development, staff satisfaction, time management and customer relations and satisfaction as the most important IC for their firm.

For example, the marketing manager at CONS1introduced the main business of their firm. Then he specified the most important IC according to the type of business they are doing in the firm. Like the majority of the interviewees, he believes that the firm staff are their most important IC and then time management comes after. Other IC elements such as work quality and firm reputation are also considered important for them. He said the following:

> *'Our firm builds houses and apartments and sells them to the clients. We also build according to our clients' demand. For the success of our business we need to make sure that our people, especially our architects, are the best in the market and they are the main IC for this company. Time management comes after people because time equals money for any business and it is the most important for our industry. Then comes the quality of work and the company reputation in the market.'*

The HR manager at CONS1 agrees with the above statement by arguing that human capital is the most important element for his firm. Then other IC elements are the result of staff knowledge. He believes that IC elements such as work quality, good customer relations and firm reputation are the outcome of investing in the firm staff. He stated the following:

> *'In this section of the company we look after one of the most important IC resources which is the human capital. We all in this company believe that the human capital is the base for all the IC investment because they have the knowledge. Their knowledge can result in better quality of work and that will result in good relations with customers which affect the company reputation positively.'*

The CEO at CONS1 believes that firm image is the most important IC for his firm. He argues that all other IC resources such as work quality, on-time delivery of project, staff development and satisfaction are employed to enhance the firm image. So, he explains that by saying the following:

'The first thing to mention when talking about IC is the firm image. For me, the good image is a result of quality work and on-time delivery of projects and both are parts of the firm IC. To build any firm image or reputation you need to have the right people and to get what you need from them you need to make them satisfied by all means. The people development and satisfaction are our main IC and they are the main source for all other IC resources.'

7.3 The impact of IC on a firm's CA

Previous studies stress the importance of IC in developing firm competitiveness in the market (Zhou et al., 2009; Chang, 2011; Kim et al., 2012; Santos-Vijande et al.; 2012, Cui et al.; 2014, Li and Liu, 2014). However, the focus of those studies was on specific elements of IC. For example, Zhou et al. (2009) study the impact of customer value and market orientation, Chang (2011) focused on the impact of corporate environmental ethics and Kim et al. (2012) investigated the impact of marketing management and recruitment management on either CA or FP. This study differs from previous studies in that it examines the holistic picture of IC, using both a questionnaire survey and interviews. Responses from the interviewees suggest a positive impact of IC on firms' CA. A good example is presented by the entrepreneurship manager at TEL2:

'We invested successfully in IC. For example, one of the most important IC is our staff. We invested heavily in our staff and they can actually compare themselves with younger staff in other firms who are working in similar positions and definitely they will find themselves in better wages, in a better development plan, they are actually sent for development programs and they are given more benefits and that definitely make them more qualify and more loyal and these are our important tools for competition. So, we actually absolutely have win the competition by investing into the intellectual capital.'

He saw the relation between the firm's investment in human resources development and the firm's ability to attract the best qualified staff in the market and also in making the staff more loyal to the firm as two of their strong CA in the firm. The human resource manager at OIL2 also highlighted the importance of human resource development in building the company's competitiveness. He said the following:

'Yes, absolutely because whatever we invest today in IC, including the selection of competent staff, providing good training, and supporting them with good manuals, procedures and processes of doing business will

make them the most capable staff in the market; this helps us to compete successfully in the oil refinery market".

The marketing manager at SERV4 looked at the impact from different aspects. At the beginning he focused on using brand awareness as a competition tool. Then he moved to the importance of staff in building the firm's competitive capabilities. He said the following:

"One of our IC is our brand awareness, it is almost a neck to neck when it comes to market share, which is one of our strongest CA. We are already racing neck to neck, when it comes to the market, when it comes to the number of subscribers, when it comes to the number of customers, when it comes to offers and this is a result of our brand awareness program. Our firm creativity in brand awareness enhances our competitive abilities and this is a result of innovation and innovation comes from knowledge and experience of young people or from people who actually have good experience; to have them to that level you need to invest in them and that definitely can be reflected in your CA'.

The marketing manager at SERV6 also added the following:

'The well-known brand actually has a positive impact, and if you actually follow financial sheets and financial reports, you actually can see the growth in all aspects paid in market share percentage, paid in revenues and paid in number of subscribers. So, it actually lifted up competitiveness'.

The CEO at the manufacturing MAN1 supported his thought but focused on the firm image instead of brand. He argued that establishing a good image for the firm has a major role to play in competing successfully:

'Yes, definitely it is. One of our competitive advantages is being the number one cement company in Oman and supported by the government, and this image was built over a long period by investing in our people and make them loyal to this company, so they will choose us over others. The image is also enhanced by caring about the environmental issues surrounding our operations. This gives us more positive points over our competitors in the market'.

The drilling manager for OIL1 focused on the impact of innovation as one element of IC investment on the firm's CA. He believed that the investment in IC added value to the projects the firm implemented, which differentiated the firm from its competitors. To explain that he said the following:

> *'Well, if you think about this company or the industry, it is very important to be innovative, to be one step ahead of the competition and you can see this in many project work that we've been doing in this company and has been the first company to do it in the industry, and we felt by investing in intellectual capital, we would be able to do such projects and add value to these projects; we noticed better results when we compare ourselves with competitors in the market'.*

From the above discussions, it can be concluded that IC has a positive impact on firms' CA, which supports hypothesis H1A that high IC firms have greater CA than low IC firms.

7.4 The impact of IC on FP

The impact of IC on FP is widely investigated and the literature shows that there is a positive impact (Youndt et al., 2004; Tayles et al., 2007; Kamukama et al., 2011). To investigate this relationship the interviewees were asked two questions, which were (1) whether IC has any impact on FP, and (2) if yes, whether the impact is direct or indirect. The answers to those two questions were in line with the findings of the above three previous studies. As both Youndt et al. (2004) and Tayles et al. (2007) found positive relationship between IC an FP and Kamukama et al. (2011) found that the relationship between IC and FP is indirect through the impact of firm CA.

When the interviewees were asked about the impact of IC on FP, the marketing manager at SERV6 said the following:

> *'Absolutely there is a positive impact, because, the more you invest on these intellectual assets, you actually unconsciously will realize how strong your organization is. We noticed that the more we invest on developing our brand, developing our staff and developing our customer relationship the more success we realize and this success is reflected in the company profitability'.*

He linked the company investment in IC such as brand, staff and customer relationship development to the success of the firm and he suggests that the firm success will be reflected in the firm overall profitability.

The CEO at MAN1 views investment in IC as investment for business sustainability. He believes that investment in IC is an investment for the long term. So, if the firm invests successfully in enhancing employees' knowledge, it will be reflected in the firm's performance in different aspects, and he describes that as the following:

> *''We are talking about business sustainability for the long term and part of our strategic plan is to build the IC investment in the organization. The success of the company depends on its people. The knowledge they have, their ability to carry out their work, to comply with the regulations and this all will result in better performance of the organization, better image and more customer satisfaction'.*

More specifically, the technical manager at OIL2 argues that the operator skills can affect the overall performance because the unskilled operator can affect the whole operation by making a single mistake. The output will be less and consequently will impact the management performance and the company's operation and profitability, so he described the relationship between IC and firm performance:

> *'The link is one hundred percent. If an operator makes a mistake I will receive a complaint. If an operator makes a mistake I can have an incident that affects the environment. So it is very important that the operators are well trained and an operator that rarely makes any mistake is quite valuable because the operation will not be distracted and that will lead to more output and that means more profit'.*

CEO at SERV2 further supports the positive relationship and with a particular focus on the positive impact of reputation on firm performance. He believes that good firm reputation will benefit the staff and help build good relations and trust with its stakeholders, which will ultimately positively affect the company performance. His argument is as follows:

> *'Being a well-known organization you give the privilege even to your staff to get loans because they are working in this company. So the [firm] reputation is very important to our staff and to the society that they understand who they are dealing with. Second, the reputation will help build our relation and trust with our customer, suppliers and creditors, and help to get more facilities and more benefits through different channels directly and indirectly, and that for sure pushes our performance for the better'.*

When it comes to understanding the impact of IC on FP and whether it is direct or indirect, we get mixed results. Some respondents think the impact is direct, whilst others think it is indirect. Analysis of the further explanations given by the interviewees suggests that the impact is indirect. For example, the project manager for OIL2 said the following:

> *'Yes, I think it is very directly linked and you can't achieve a success in a company without having IC built-in, so you need to build your IC investment correctly; so they need to be included and managed in the company plans early ahead in the organization and then the success will be realized.'*

Whilst the impact of IC on the firm's success was said to be direct, conditions of correct IC investment and good management through planning were considered important in order to realize the value of the IC investments. These conditions can play the role as mediators for the relationship. Another example on this is the response given by the human resource manager at BANK1:

> *'I think intellectual capital is very directly linked to the firm success. The success of this firm is based on decisions the employees make or the decisions the management is making in order to carry out the operations. So, all of them have to be ready to carry out the operations right. We need to be more effective than the competitor in these aspects. We need to make better decisions than the competitors. So, how we invest in intellectual capital and in the development of the employees has a direct input for the performance of the company'.*

The explanations highlight that the indirect impact of employee, management decision making and investment in employee development, with the 'right' operations being the mediator for realizing the outcome expected from the investment in IC.

Those who described the impact as indirect believe that the relationship is affected by other factors, such as good management of the resources, improving the competition level above competitors and making the right investment. For example, the human resource manager at SERV1 argues that the benefits of staff training will not be realised without appropriate management and monitoring:

> *'It is indirect because the impact of staff training will not be realized directly and it is not enough to provide the staff with the training without assessing the staff performance after training, without monitoring the impact of the training and without investigating the staff's further needs of training. So I think it is not enough to buy the meal ingredients but you need to have the cooking skills, the right measurements of ingredients and right taste in order to produce the best meal'.*

The CEO at SERV2 also argues for an indirect impact of IC on FP, taking the impact of company reputation as an example. So, he suggests that firm reputation does not directly affect its performance. Therefore, he advises businesses to continuously invest in enhancing their reputation in the market in order to reach a level above their competitors, so then only they can generate the benefit. He clearly stated that by saying the following:

> *'It is indirect. For example, company reputation will not affect your performance directly, but you need to work hard to enhance it and to keep it up above your competitors' levels in the market. So you can realize the outcome because starting with good reputation is not the final process and will not give continuous impact if it is not continuously pushed up'.*

Support of the indirect impact is also provided by the human resource manager at MAN3*:*

> *'It is actually indirect. For example, by getting or acquiring the right mindset and the right attitude of people, you would actually have people performing but if you don't develop them and innovate on them to cope with the market situation and needs, you will not be ready to compete, so you will fail because you are not competitive enough'.*

He highlighted the importance of firms' competitiveness in its influence on the relationship between IC investment and FP. The analyses provided in this section suggest that IC and IC investment, such as building firm reputation and staff development have a positive impact on firm performance, and thus firms with high IC or IC investment will outperform firms with low IC or IC investment, though the impact is indirect. The analysis also shows that building firm reputation and the appropriate staff development can contribute towards a better CA. Thus, hypotheses H1C and H1D are supported, in line with the findings from the questionnaire survey.

The above analyses provide a strong support to the following hypotheses:

H1C. High IC firms outperform low-IC firms.

H1D. IC has an indirect effect on FP via the firm's CA.

7.5 The impact of CA on FP

The above sections discussed the impact of IC on CA and then the impact of IC on FP. The analysis also shows that the impact of IC on FP is indirect via CA.

This suggest that there is relationship between CA and FP. Therefore, the interviewees asked to give their opinions about this relationship. The effect of CA on FP was well researched and evidenced in the literature. Many previous studies found that firms with high CA show better performance than those with low CA (Zhou et al., 2009; Cao and Zhang, 2011; Kamukama et al., 2011; Murray et al., 2011). The finding from the interviews conducted in this research is consistent with the findings from these studies. All the interview cases supported this argument.

The response from the loan management manager at BANK2 suggests that CA such as developing the most capable staff, having the best product/service quality, the best brand image, and cost efficiency all contribute to the firm's CA, which then has an impact on the firm's success (i.e. FP). He said the following:

> *'There is a great benefit for any competition. For my company to compete successfully, I build up my competitive advantages, so I need to make sure my staff are the best in the market; I need to keep the quality of my service and minimize my cost to make it affordable; and I need to tell the customers about my brand success stories. I can ensure you no company will fail by being competitive enough and for sure that success will have a clear impact in all aspects.*'

Another supporting statement is provided by the CEO at CONS1:

"Sometimes being bridled in certain product may push you to keep your quality and your product at certain level where you cannot go down. Sometimes the brand of business that you're doing and being well known by having such kind of quality will push you to keep you always up to match your competitor. So, as much as you win over your competitors in different competition aspects as much success you will gain".

His focus is on the impact maintaining the product quality and brand in a superior way than the competitors for better performance. He argues that maintaining the product quality better than the competitors makes the firm have more CA as compared with their competitors, which makes the firm perform better than competitors.

Further, staff loyalty is considered to be very important for the success of the firm in OIL3. The following is stated by the CEO:

'It is very obvious and I have seen it personally that the more loyal are your staff, the better results the company will get and they will be able to compete successfully with others; the company will definitely outperform competitors'.

He argues that by having loyal staff the firm is highly competitive in the market and that leads to better FP compared with the competitors.

The sales manager at MAN3 said the following:

'One of our competitive advantages is being the lowest in the production price. We produce products similar to those available in the market with certain quality levels at the lowest cost that every customer can afford to buy. That is what makes our company successful and gains more profit over competitors'

In his point of view, the cost efficiency as an element of IC will lead to low cost of production and that is considered one of the most important CAs of any firm. He argues that low production cost leads to low selling price that in turn enables the firm to withstand the competition over those who do not provide much attention to the IC.

From the above discussion it can be concluded that the CA plays an important role in enhancing the overall FP. The firms in the Omani market gives importance to the CA such as better staff capabilities and loyalty, maintaining the quality level, creating brand loyalty and cost efficiency in production and competitive selling price for the success of any organization in this industry. The discussion above shows how these CA affect FP.

7.6 IC management through BSC implementation

The Omani market experiences a lot of investment in IC such as staff development, staff selection, work manuals, brand development, brand awareness, customer relations, public relations, innovations and firm reputation. These IC elements are extracted from the quotes in sections 7.2 and 7.3 analysed above. The interviews with the management of the large and very large firms operating in the Omani market provide evidence on the importance of IC and its role in building CA and FP. Given the importance of IC, steps were taken to ensure and enhance their investment in IC and to employ tools and techniques to manage these resources. The responses from 98% of the questionnaire survey and 100% of the interviews show that firms that operate in the Omani market have implemented BSC or equivalent performance measurement/operational or strategic planning tools. Five of the firms whose representative participated in the interviews have implemented the BSC up to the performance measures level, 27 of them have implemented it as strategic plan by linking resources to the firm's plans, with setting targets to each performance measure achievement and almost all the firms linked the implementation to the firm incentive plan.

The interviews show that firms operating in the Omani market use BSC for measuring and managing IC. When asked on the IC elements they measure using BSC, whilst some of the responses given were general without referring to the specific IC elements, most of the interviewees' responses were focused on the specific industry in which their firm operates and their current responsibilities. An example of the general response received is that from the operation manager at SERV6:

> *'The BSC is actually the key element of the way we manage the non-financial performance of our company. It is visible and it is applied to all employees of this company. So everybody can relate to BSC and it is the key instrument to manage all our performance in different fields'.*

He highlighted the importance of BSC to the firm in managing its non-financial performance. When he was asked about the non-financial measures the firm is managing through BSC, he listed some of IC elements such as staff performance, service cost, service time per customer and return on investment.

Another general response is provided by the operation manager at TEL1. He admitted the use of BSC as a tool for IC management and explained how things are managed using the BSC. His remark is provided below:

> *'We use BSC to manage IC and we have a set of KPIs within the main scorecard to measure our performance in each aspect of IC, so what we do every year we detail the items of focus for that year and these items are reflected as task and targets for each individual staff to deliver and individuals will be assessed against these tasks and targets. Then all staff achievements will be assessed against the overall company scorecard.'*

The entrepreneurship manager at TEL2 was more specific in his response:

> *'IC is managed through BSC. If you talk about training, if you talk about developing individuals, then they are part of the KPIs included in the BSC.*

> *So, personally I have a scorecard where there are KPIs specifically on entrepreneurship and knowledge transfer. So, I have to measure my department's performance on knowledge transfer to different parties and how many investors we attracted and link all our results with the research and development section.'*

Although the interviewee is from the entrepreneurship department he focused on areas such as staff training and development. Staff training and development are considered IC elements that are included in the firm BSC and KPIs are set for them. Moreover, he described the IC elements within his responsibility. He highlighted the inclusion of KPI's for knowledge transfer, how they measure the department performance at different knowledge transfer aspects and then the linkage of all other activities with the research and development department for better results. His statement highlights the importance of BSC in managing IC resources and helps the firm departments to link together through BSC implementation.

The marketing manager at OIL4 discusses the use of BSC in relation to customer satisfaction, one of the most important elements of relational capital, by saying the following:

> *'We don't measure all elements using BSC, but we use it to measure the relation with customers. We have a KPI for customer satisfaction, so, we have a specific score that needs to be achieved. For example, for network availability satisfaction, some customers say "Yes and some say "No", but the score has to be above 80 percent of satisfaction. When it comes to customer satisfaction after sales, or customer satisfaction with products and offers, there is a KPI that measures specifically how satisfied are the customers, how good are you in your relation with customers.'*

The response from the HR manager at CONS1 suggests that the company uses BSC to manage IC, and it concentrates specifically on performance measures for staff development and motivation as an example:

> *'Yes we do use it for IC management. For example in the BSC, we have a performance measure to measure staff performance, needs, and how they can be motivated. So in order to implement this measure our company also implements staff yearly survey and its standardized survey for the whole company. It is questionnaire based and it looks at different areas of the engagement of staff, their development, how they see the company is moving, how they feel their needs are managed and how they can contribute to the success of the company.* This project of annual survey is the key part of the senior management responsibility of this company. All

of the outcomes of this study show how to respond to staff needs and what can be done to motivate our staff to take the company to the next level.'

The CEO at SERV6 also reflected on human capital as one of the most important elements of IC that is managed using BSC. He also considered some additional elements such as customer satisfaction. He reflected that by saying the following:

'To start with, we have the human capital as part of the firm's BSC. So over the last three years we set a KPI for recruiting the right people at the right time. This year we used BSC for the training and development [staff], because we recruited last year a number of graduates and would like to see how they progress by measuring their training needs and achievements as well as monitoring their performance. The customer satisfaction is also identified within the firm's BSC, but it is more focused on the marketing section of the BSC'.

The response from the operation manager at SERV1 suggests that the firm uses BSC to manage a wide range of issues, which includes IC-related issues such as health and safety, quality management, relation with suppliers and vendors, community and social responsibility and relation with stakeholders. So, he reflected that by saying the following:

'We use the BSC to measure health and safety, quality management system. We use it to manage the contact with suppliers and vendors. We also use it to manage our budget, capital investment, capital budget and also operation expenditures and how we maintain and control our daily, monthly and quarterly expenses. We also have CSR which is the community social responsibility and obligations toward country and society as well as managing stakeholders are all part of the firm's BSC.'

The discussion above provides the explanations on how firms operate in the Omani market uses the BSC. The interviewees have emphasized the use of BSC for managing IC resources such as staff performance, staff development, staff motivation, staff recruitment, customer relations, customer satisfaction, relations with suppliers, health and safety, quality management system, budget management, capital investment, capital budget, operation expenditure, and community social responsibility.

7.7 BSC alignment to the firm's operation or strategic plans

This area reflects the second stage of BSC implementation as presented by Speckbacher et al. (2003). At this stage of implementation the performance measures of the firms are based on firm strategies, goals and objectives, KPIs and targets. All responses suggested a clear link between BSC implementation and their firm's strategy or operation, though each manager described the link in different way. For example, the entrepreneurship manager at TEL2 suggests that BSC is linked with both operational and strategic plans in his firm:

> *‘Yes BSC is linked with strategic plan because for this year both strategy for investing in innovation centre and cooperation into research labs were included. Also there is a program that is running now for entrepreneur for one of the units in the market and we are using an operation plan to measure the program performance and this plan is part of our company’s BSC. As each department has its own project plan and in the operation plan we review the progress of all departments by reviewing the progress in achieving these targets. For example, with the entrepreneur we measure the strength, what we need, where are we, when is the launch, what is the kick off. So, all these are measured’.*

The finance manager at OIL4 described how the link between BSC and strategic/operation plans is created:

> *‘It is linked, so we first set vision, mission, value and promise of the company, which outline how the company should work. We also manage governance, quality manual, standard procedures, HRM manual and financial manual as part of both BSC and strategic plan. So we have a driver from top to bottom on how to deliver in our company. We have KPIs and targets set within the BSC to measure our performance in different areas and they all link to the company’s annual plans’.*

The loan management manager at BANK2 said the following:

‘Almost all the KPIs in our BSC are based on the company strategic plan. For example, we have strategies to improve human skills, brand awareness, customer satisfaction and service quality. So, the BSC reflect all these strategies and assign KPIs and target for the achievement of each strategy and the achievement of all departments BSC will be linked to the achievement of the company strategic plan’

However, the CFO at MAN2 described their BSC as a strategic plan type:

> *‘Our BSC is a strategic plan type and it does include both financial and non-financial elements starting from health and safety, quality management, training management, budget plans, financial plans, contract management and all related aspects’.*

His response clearly suggests that the firm uses BSC for strategic planning. Their BSC links both financial and non-financial measures in order to create balance between them. Their BSC is according to Kaplan and Norton (1996a-c).

After understanding the BSC implementation in the Omani market and knowing its link with the firm's planning system, an attempt is made in the forthcoming sections (7.8 and 7.9) to investigate its impact on the firm CA and performance.

7.8 IC management (through BSC implementation) impact on firm's CA

As is evidenced by the questionnaire survey and the interviews, BSC or its equivalent performance measurement tool is implemented at most of the participating organizations to manage their IC. It is argued by Kamukama et al. (2011) that IC and IC investment have a positive impact on firms' CA. We can therefore expect that firms that manage its IC and related investments using management or measurement tools are more likely to have greater competitive advantage than those that do not. The interviewee described this relationship from different perspectives. For example, the CEO at CONS1 said the following:

> *'There is a saying in business: if you don't have BSC you will not make as much money as you want because you will lose the required balance in operation. And if we look at the industry and the environment the company is working in, you lose focus if you just look at the maximum return on investment. Of course you want to be there, but what you [are] missing out is to consider the risk of the investment, you also lose your strategic focus because you don't adapt with what might happen in the future and you don't have the clear view about how you are doing comparing to the competitors. So I think you will lose the competition'.*

He believed that the impact of BSC use on competitive advantage is there, in that the absence of a BSC could result in unbalance in the operation, lack of consideration of risks involved in investments, and loss of strategic focus. He also believed that without BSC implementation the firm could lose its strategic focus, so will be less competitive in the market. His statement provides strong evidence that BSC implementation result in stronger CA.

Other managers like the sales manager at MAN3 looked at the BSC as guidance:

> *'Of course, I think BSC is the guidance. So, If there is no good IC resources management or there is no BSC at all, then, you are actually shooting in the dark. This will result in ad hoc or random plans. So, when there is no specific strategy, then you expect [the] results [to be] ad hoc, [and] your results are not measurable. The BSC is very, very important because it is*

a road map and it is a framework that shows you where you want to reach and what you have to use. So if you want actually to manage your valuable resources for better competitive advantages, you need to have the scorecard which tells you how you actually managed them to get to the exact point.'

BSC is viewed as a road map that guides the firm by this respondent. In his view, in order to manage a firm's valuable resources, which includes IC, to build or enhance competitive advantage, BSCs are needed. This supports the impact of IC management through the use of BSC on competitive advantage.

The human resource manager at TEL1 highlighted the importance of BSC in cascading firm objectives to employees at all levels, and in motivating employees to be focused and in achieving them. The importance of appropriate performance measures are also emphasised on in his response. These, in his view, all contribute to the company's competitive advantage.

> *'I think BSC gives focus on what the company really wants to achieve, and by implementing it at all levels the objectives are cascaded to individuals. Then those individuals will be more focused on achieving what the company wants to achieve like its vision and objectives. So, it is very critical and very important for any company to implement scorecard with proper performance measures for the job of any staff because that makes them more focused in what they are doing and they don't get diverted to other things which are not important for the company, and that makes them more competitive in the market'.*

The marketing manager at CONS1 agrees with the positive impact of managing the firm's IC resources on its competitive advantage, although without specifying the tool(s) that is/are employed in the firm:

> *'I can see the better you manage them, the more positive result you will get for sure, so it is a win-win sort of relationship. If you manage it well, if you manage keeping your database, your people, your customer relation at high, then it will impact your CA positively'.*

The marketing manager at TEL2 also agrees with the positive impact of implementing BSC on the firm's competitive advantage and suggested that implementation at the subsidiary level will contribute to the group's competitive advantage.

> *'The BSC implementation has great impact on our competition abilities. Our BSC is an integrated scorecard from the mother company. So if we implement our scorecard right and all areas have proper performance measures with the right KPIs and targets, then you will have better qualities than [your] competitors. So you will be better in managing your customer, in managing your staff and overall knowledge within the company, and automatically that will be reflected in the mother company's competitiveness'.*

Other interviewees also supported the positive impact of BSC implementation on the firm's CA by referring to the management of specific elements of IC, such as innovation, by the training manager at OIL1,

> *"Yes, definitely there is impact. For example, if you look at innovation, I mean how innovation can be driven, how does the company become innovative with high competitive advantage. For us in this industry, it is based on the intellectual capital we have in this company and based on the way we run and manage them. So they are the key role player."*

The importance of managing the customer relation is emphasised by the marketing manager at MAN2:

> *'There is a strong relation between them. For example, one of our important ICs is our customer relations and customer satisfaction. Because our customers are big companies not individuals. So if we don't deliver our promises to them in the right shape and at the right time, we will lose them. So it will be hard to compete in such circumstances and we definitely will fail. So we need to manage our relations with customers in order to compete successfully'.*

IC elements including staff satisfaction, service quality, customer satisfaction and brand awareness were emphasised in the response from the human resource manager at SERV3 in his comment supporting the positive impact of BSC implementation on competitive advantage:

'*By implementing BSC we will be more focused on making our staff more satisfied, improving our service quality, enhancing our customer satisfaction and improving our brand awareness, so this will make us more competitive in the market and so our staff and customers will be more loyal and difficult to be attracted by competitors'.*

To conclude, the responses from the interviewees clearly support that IC management through the implementation of BSC (or equivalent performance management tools) has a positive impact on firms' CA. Most of the interviewees highlighted the benefits of having clear objectives, greater focus, better link with the strategy, and acting as a road map or framework/guidance to follow, through the use of BSC, which leads to greater competitive advantage.

7.9 IC management (BSC implementation) impact on FP

Previous studies have found a positive impact of BSC implementation on FP (e.g. Hoque and James, 2000; Malina and Selto, 2001; Olson and Slater, 2002; Davis and Albright, 2004; Braam and Nijssen, 2004; Iselin et al., 2008; De Geuser et al., 2009). Findings from the interviews in this study provide further support on the positive relationship. For example, the drilling manager for OIL1 look at the BSC as a tool that helps them to manage their investment on projects. He argues that by managing the IC within the project, the firm can achieve better results in term of performance,

> *'Yes, the BSC implementation [is] playing a major role in this company's success. So, if you look at the company and what we are doing, we have a lot of project based operations, with high investments and with a lot of financial capital. But also on the intellectual capital and intellectual capital management side, this company is kind of figuring out how to invest in intellectual capital. So the successful investment and the better development and management of the intellectual capital will help us to invest in the right way. So if you look at the position of the company compare to competitor we are in better position and our performance is better compare to them'.*

The CEO at OIL3 supported the impact of BSC on their firm's performance and explained that the impact is due to BSC's role in setting the direction and focus, the objectives and performance targets:

> *'Yes, there is a strong impact. For us, it is giving us the direction on how to achieve the company goals and obviously by the end of day we will be measured based on what we have achieved and based on the targets in BSC. So, it is a direction for us and helps us to focus on the important areas for better results".*

The human resource manager at TEL1 discusses the impact of BSC use in managing employees on their company's performance in different areas,

> *"Yes, there is strong impact. Because if you manage your staff using BSC, it will increase their performance; it will increase their knowledge; and accordingly the brand will also have better position in the market; and the customer satisfaction accordingly will go actually better; and many entrepreneurs would actually work to have tie up with you".*

The human resource manager at OIL2 supports this view by suggesting that the use of BSC in employee management enhances employee performance and productivity, which then improves the firm performance.

> *'Sure the relation is evident. The impact here is not only from implementing the BSC as a tool, but also from managing the most valuable resources. For example, say the company recruited five staff at different areas of the company and those staff were not satisfied with their work environment. They did not get enough training on their job requirement and they are not motivated enough to produce more. These staff will quit at the first offer. However, if the company manages their performance at all these areas, measures their satisfaction, and all their needs are managed well, they will perform better, their productivity will be better, and this has tremendous impact on performance'*

7.10 The impact of the level of IC on BSC implementation

In terms of whether the level of IC of firms had any impact on BSC implementation, Speckbacher et al. (2003) found that the firms that implemented BSC in the German market did not implement it for IC management purpose. However, Tayles et al. (2007) found high-IC firms to be more likely to implement BSC than low-IC firms. The evidence from the interviews of this study supports the finding from Tayles et al. (2007) that BSC implementation is associated with the level of IC of firms. The interviewees however see this relationship to be continuous in that some believes that the investment in IC will result in greater need for BSC implementation, while others are of the view that the use of BSC could result in better IC management and thus greater IC/ IC investment, and yet others comment directly on the continuous relationship.

The operation manager at SERV1 believes that the investment in IC increases the firm's needs for implementing BSC or any IC management tool. So, the following are his comments regarding the relationship between the level of IC and BSC implementation:

> *'The nature and the level of IC is a direction to decide on the right measurement tool. For example, in aviation industry, we have both tangible and intangible resources to measure. So not all available tools will work with all except BSC. So as you increase your focus on IC, you need to give more focus to BSC implementation. Otherwise you will lose your direction.'*

Another example is presented by the CEO at SERV2:

'The BSC shifts the focus to areas like safety, staff development, better customer service, innovation and many sustainable development areas. So the BSC pushed the company in that direction and makes us more IC focused. So I think that as we invest more in IC, we need to widen our BSC span [more].''

Moreover, the CEO at CONS1 agree with them by saying the following:

'I think if BSC is used to measure staff performance and targets set to measure achievements, then the staff will become more loyal and will work hard to achieve ….'

Another group of the interviewees sees a continuous relationship. They believe that the need for BSC implementation increases by the increase in IC level in the firm. Accordingly, when the BSC implementation extent goes high and the available resources are managed effectively that results in increasing the IC level. For example, the loan management manager at BANK2 said the following:

'I think there is a positive relationship between IC level achieved and the BSC implementation or any other tool used to manage IC. Actually this relationship can be positive either from IC to BSC or from BSC to IC, because companies with high IC level need to use BSC more than those with low IC, because these types of assets are not easy to be reported financially. So BSC is the best to deal with managing these assets. Also the implementation of BSC can positively affect the level of IC in the company. For example, if I manage the performance of my people in all aspects, so they will be more motivated, gain more experience and gain more knowledge, so my human IC will become more.'

The above statement is also supported by the human resource manager at OIL2:

'Yes. Having identified my intellectual capital that requires the usage of a proper tool that can help in managing these resources, so there will be an increase in the need for BSC use, and by implementing the BSC and identifying your areas of weaknesses, it makes you focus on some elements and by giving it focus you will invest more in it. So the level of IC will improve in your company.'

The above analysis suggests that Omani firms with high IC are more likely to implement BSC for IC management, which could then result in increase in IC or IC investment. This result is consistent with the finding from the questionnaire survey reported in Chapter 6. Therefore, hypothesis H2.1A is further supported by the interviews.

7.11 The impact of BSC implementation extent on its success

Whilst previous literature on BSC examined the impact of its implementation on FP (Hoque and James, 2000; Davis and Albright, 2004; De Geuser et al., 2009), the impact of implementation extent on its success has not yet been investigated. The results from the questionnaire survey suggests that the fuller the BSC implementation the greater the success in the implementation, supporting hypothesis H3.3A. Responses from the interviews lend further support to this finding. The CEO at SERV2 supports the positive relationship:

> *'I can see a strong relationship. If the BSC is fully implemented and all implementation process is taken seriously during the implementation, then implementation extent will become high and consequently the success of implementation will rise accordingly.'*

Another example is provided by the drilling manager from OIL1, detailing the requirements of BSC implementation,

> *'Definitely there is a positive relationship. To achieve high level in implementation you need to consider all BSC implementation areas, so you need to measure both financial and non-financial resources, to have cause-and-effect relationship between different performance measures, to consider the link between the company plans and BSC plus other related parts of BSC implementation. In my opinion, all these considerations will result in a very successful implementation.'*

7.12 The impact of management support on the success of BSC implementation

Previous studies in this area mainly focused on measuring firm success as a result of BSC implementation (Hoque and James, 2000; Davis and Albright, 2004; De Geuser et al., 2009), with no attention given to the factors that could make BSC implementation more successful. The literature suggests that there are some factors such as management support, incentive linked implementation and the implementation at different levels of the firm can lead to better performance (Kaplan, 2008). However, the impact of these factors on the success of implementation was not investigated. The questionnaire findings of this research provides strong evidence that these factors are significantly associated with the success of the firm. Moreover, the interviews result also supports the questionnaire findings. The discussion in this section and sections 7,12, 7.13 and

7.14 explain the findings, while section 7.15 discuss the other success factors considered by the interviewees.

There are many types of support expected from the management to BSC implementation. (Kaplan, 2008) suggest that managers can involve themselves in BSC design and implementation, performance measure selection, setting targets for different performance measures, encouraging BSC implementation by motivating subordinates to achieve the targets set and encouraging subordinates to design and implement their own BSC for the management of different units or activities. When interviewees were asked about the types of support provided to their subordinates with regard to BSC implementation, their response was related to the selection, achievement and review of KPIs. For example, the project manager at OIL2 sees his support is conducting regular meetings with subordinates and measure achievements and review targets:

> *'As my position, I do support my staff in BSC implementation. Because more than seventy percent of the BSC of the project are under my responsibility, and I have clear understanding over all BSC elements, and I reflected this to my subordinates. So I meet with them on monthly bases to measure the achievements so far, and review our targets for the coming periods if needed'.*

Similarly, the CEO at SERV6 said the following:

> '*My subordinates are the lower level managers. So we meet regularly to discuss different issues. One of them is the achievement of different departments in the KPIs within the BSC, and I advise them for better achievements and to appreciate high achievers.'*

He also included recognising high achievers as part of his support.

The training manager of BANK1 said the following:

> *'Yes, of course. They have to be involved as it is the management's responsibility to create the environment for proper implementation, provide individual training for staff and go through the KPIs in order to help in selecting them and at the end they need to monitor the performance of their staff. In my case, I'm supporting my staff in all aspects because their KPIs are part of my KPIs, so if they are successful I will be successful'.*

Support such as providing the right environment and staff training in addition to the setting of KPIs and monitoring of staff performance was mentioned, which could be explained by his role as the training manager. More interestingly, it is suggested that the success of the employees in terms of achieving the KPIs set in the BSC forms part of the management's success.

When the managers were asked if they can see a link between the supports they provide for their staff in BSC implementation and the success in the BSC implementation, they all agreed on a strong relationship. The human resource manager at SERV3 said the following:

> *'Of course, if you support your team and provide them with the right tools that will help them to achieve the targets, that definitely improves the success in the scorecard implementation".*

In addition to providing the support, he also mentioned the need of right tools to be given to achieve the set targets which will lead to the success in BSC implementation.

The entrepreneurship manager at TEL2 looked at it from a different angle by discussing the success of the employee he is supporting, which could reflect the success of the BSC implementation.

> *'Now, in many cases, my support has actually positively impacted the performance of people who actually worked with me for the last two years and some of them are actually now senior managers. So, my support is reflected in achieving all the targets our team planned for as part of the department BSC. Therefore, our team is rewarded due to our success in implementation"*.

The CEO at MAN1 see his support and drive being the key to lead the company to success, including the implementation of BSC.

> *'One hundred percent! If I sleep, all my organization will sleep. I'm the driver. So if I'm going slowly or not pushing things to happen, things will collapse and that impact me first, impact the company as a whole, impact the scorecard implementation, and impact our reputation with all stakeholders'.*

The CEO at SERV2 emphasised the importance of management support at all stages of BSC implementation to ensure its success in the service industry.

> *'The service sector is even harder than producing product. Managers play a major role in getting things done as planned. Not all the services require the same areas of attention. So the management support at all stages of operation is important. For the BSC to be successful, [it] needs total*

> *support of management at all stages of implementation from selecting the KPIs until reviewing and monitoring".*

From the above analysis, it can be concluded that management support has positive impact on the success of BSC implementation, providing support to hypothesis H3.2A.

7.13 Incentive link to BSC implementation and its impact on the success of BSC implementation

The incentive plan has been found to have significant impact on the implementation of performance measurement systems (Baker et al., 1988; Baker, 1992,; Ittner et al., 1997). The finding is further supported by the results from the interviews conducted in this study in that the incentive plan linkage to the performance measures in the BSC has positive impacts on the success in its implementation.

The operation manager at SERV1 expressed his opinion by saying the following:

> *'Yes they are linked. I believe if you don't link the incentives then I don't think people will really take it that seriously to implement the scorecard or to achieve the target linked to it, and then the company will not be successful in its implementation of BSC'.*

His response suggests that he is relating the success in the BSC implementation to people's attitude, commitment and motivation towards the use of BSC. The link with incentives will help to motivate the employees to commit to BSC.

The loan management manager at BANK2 believes that BSC without incentives does not work because motivation plays a major role in enhancing staff productivity and therefore the success of BSC implementation:

> *'I think BSC without an incentive plan doesn't work. If you have a BSC with no incentive and no motive, [then] what is it for? For example, if you set KPIs for achieving more tasks in quality management and the staff achievement is outstanding, and at the end of task you say thank you, the word thank you is out of the pocket, and that staff will not show the same achievement in the next task and definitely the BSC will fail'.*

The CFO at MAN2 agrees with the above argument:

> 'Motivation *plays an important role in the success of BSC implementation, because there are targets to be achieved at certain percentage or number.*

So from experience those targets will become idle if the staff are not rewarded for achievement. It is a give-get concept'.

It is believed by the CFO that targets set within the BSC will not be achieved if the achievements are not rewarded. Thus incentives need to be linked with the KPIs and targets set in the BSC to motivate staff.

The human resource manager at MAN3 looks at the issue from a different prospective. He believes that BSC implementation should be linked to incentive plans at all levels, including the corporate level, in order to achieve the maximum effect.

'If you link it at the corporate level only, then the effect will be minor. Individual managers cannot enforce the performance of BSC implementation for the whole company. The financial and non-financial incentives are the key driver for any staff performance. So any rewarded achievement will always enforce better results'.

The analysis of the interviewees' responses shown above provide support to hypothesis H3.2B in that linking incentive plans to BSC implementation has positive effects on the success of BSC implementation.

7.14 BSC implementation at different business units and its impact on BSC implementation success

In terms of BSC implementation at different business units of firms, Kaplan and Norton (2008) found that the BSC implementation resulted in better firm performance when the implementation was at all business units of the firm. However, this issue was not investigated in relation to the success in BSC implementation. This study therefore examines this relationship. The interviewees were asked if BSC implementation at different business units of the firm makes it more successful. Their responses were positive in all cases and some of them highlighted the reason for this effect. As an example, the operation manager at TEL1 said:

'To a certain extent, yes, our company is successful in BSC implementation, because it is implemented in all levels, in the company level, the group level, the department level and within the employees'.

The marketing manager at OIL4 emphasised the need for BSC implementation at all business units of the firm. He argues that implementing it at the corporate level only will create the problem of communicating the firm strategies and targets to everyone. So, he said the following:

> *‘Yes, it should be implemented at all levels. If it is implemented at the corporate level only, then there will be always a weakness in communicating it and there will be always challenge in how to communicate it to others. But if it is implemented across the levels you will be 100% sure that people have enough understanding of what is the strategy, what are the KPIs and everyone will be working to achieve the same".*

The operation manager of SERV1 agreed with the above statement and stressed the need for BSC implementation at all business units:

> *'The BSC should be implemented at all levels of the company because to achieve the corporate goals all individual should work toward achieving the same goals'.*

Another support is provided by the operation manager at SERV6, who said:

> *‘I think the BSC will be more successful if it is implemented at all levels of the organization, because it is of no use to be implemented at one level or at the corporate level only. Because, the staff at the corporate level will focus more on the financial goals and they do not consider all the kind of goals that will balance the operation of the company. So the operation is not cascaded from the corporate to the employee level. So according to that I don't think you will be successful in BSC implementation’.*

He is of the view that BSC implementation only at the corporate level will give more focus to the financial objectives, which could result in unbalance in the operation of the company, and thus lead to failure in the BSC implementation.

The BSC implementation at all business units make staff aware of all the tasks required by them to implement. The project manager at OIL2 argues that the BSC is a task requiring teamwork and everyone has to be involved to reach the expected success in the implementation. He said the following:

> *‘The BSC needs to be implemented across the company. We can’t implement any BSC at one level. If the subordinates don’t see what need to be delivered, they will not deliver because it is a teamwork task. Everyone has to be involved from the management to the lowest staff. So the more BSC cascaded to different levels of the company the more successful it will be’.*

The CEO at CONS1 supports the above argument:

"If I implement the BSC at the top level alone, it will not work. Because every KPI and target is to be assigned to a different department and individuals to be achieved. As an example, customer satisfaction is a marketing department job, staff training is a human resource job, and budgeting is a finance job. So for these to be achieved successfully, the BSC has to be cascaded to everyone in the company".

His argument emphasised that the responsibility for the different KPIs and targets set in the BSC are assigned to different departments of the firm, and thus involvement and implementation at all business units are needed.

From the above analysis, it can be concluded that BSC implementation at all business levels of the firm from the top to the staff has significant impact on the firm's success in BSC implementation, supporting hypothesis H3.2C

7.15 Other success factors for BSC implementation

The questionnaire survey and the interviews conducted investigated into this area. Not all of the responses given by the interviewees fell within the three key factors only, i.e. management support, linking BSC to incentives and BSC implementation at different business units of the firm that were expected to have an impact on the success of BSC implementation. The interviewees, whilst providing some similar opinions, some of the interviewees agreed on the selection of the right KPIs and involvement of staff at all business units being two of the most important success factors for BSC implementation.

This is particularly highlighted in the response given by the operation manager of TEL1:

'Identifying the right KPIs and the right targets are the main determinants of BSC implementation success, but that required all company's parties to be involved including management, department heads and individuals'.

He suggested some other factors such as identifying the right KPIs and targets as the key factors for the success in BSC implementation. In addition to the identification of KPIs and targets, he also emphasised the importance of management support and involvement of employees from all business units in the BSC implementation.

Similarly, the human resource manager at TEL1 responded:

> *"I think what makes us successful in BSC implementation is the way we identify the areas of focus and how we set our KPIs and targets. Because that helps us identify the right resources needed for achieving our targets. Beside that the monitoring system that we use to monitor our achievement in BSC plays an important role in our success."*

He also highlighted the importance of the monitoring system used after BSC implementation for the success in BSC implementation.

The drilling manager for OIL1 emphasised on the importance of management and staff involvement in BSC implementation and said the following:

> *'It is the engagement of the company management to kind of push for the goals that are represented by the BSC. When it is just the measurement, it is only the measurement and it is not really driving the company. But, if it's really used as a management tool for the managers to say, okay, if we do some new projects and do some new investment or make some strategic decision, we need to check what does that mean in the context of BSC, not only in financial context or not only in the safety context, but to kind of see the whole picture. I think if all staff and management are involved in all the process, the BSC [implementation] will be successful.'*

When the interviewee asked to divulge the kind of pressure experienced from the management side, he replied the following:

> *"In this company the management support the staff in deciding the appropriate measures, providing the right facilities for achieving the targets planned and encourage them for high achievements."*

In addition to commenting on the importance of setting appropriate KPIs and targets, the project manager at OIL2 also suggests that involvement of all staff and linking reward to BSC implementation are important factors affecting BSC success.

> *'I think it's having smart goals that are transparent, achievable, specific, measurable, and logical. So, you have something that you can practically achieve. So you need to assign an achievable goal to each individual staff that they can achieve for certain. But that does not mean to be lenient in setting the goals only for the people to score high. You also need to involve all staff in setting KPIs and targets, because they all will be involved in the implementation and the most important is to reward them for their achievement because the results will be amazing.'*

The sales manager at MAN3 also considers setting the right goals and involvement of all staff to be important success factors, so he said the following:

'I think the big thing with BSC is that you must spend time and effort to get good input at it, and you must make sure that the input is smart and must be measurable, and everyone should be involved with getting things done.'

The management involvement and support to BSC implementation is the main success factor that is highlighted almost by all interview participants. The CEO at OIL3 referred to the need of management support in terms of offering guidance and lead by example by saying the following:

'Of course not every BSC implementation is successful; it is like applying a software to all staff and asking them to use it without providing proper guidance. The management should be the first to use and then staff [will] follow. The management should be the example for their subordinates in BSC implementation and that will make it easier for convincing and more successful.'

The above discussion shows that the interviewees support the link between the success factors and the success in BSC implementation. All of them considered the three success factors of management support, Incentive link to implementation and implementing BSC at different levels of the firms as discussed in sections 7.11, 7.12 and 7.13, while considering other factors such as setting the right goal, selecting the right performance measures, selecting the right KPIs and staff involvement.

7.16 The impact of BSC implementation success on firm CA

The BSC implementation is considered an important tool for enhancing the firm competitiveness in the market (Olson and Slater, 2002, Ansari, 2010). Ansari (2010) argues that linking BSC implementation to strategy leads to greater CA. Hence, the success in BSC implementation will further build/enhance the CA. Results from the questionnaire survey supports the positive relationship.

To examine the relationship further, the interviewees were asked about their views on whether the success of BSC implementation has any impact on a firm's CA. The analysis of the interviews revealed that firms' success in BSC implementation enhances their competitive abilities. For example, the CEO at CONS1 said the following:

'Being successful in BSC implementation means you are successful in measuring and linking different areas like staff capabilities, brand awareness, customer satisfaction with others. If the company is successful

in this sense, that for definite will result in owning the best staff in the market; your company brand being the mostly known among the others; your customers being so loyal to your products, and so for sure your company will be the strongest competitor in the market.'

He looked at the success in BSC implementation as the success in measuring and linking the performance in different aspects of IC. He argues that if the firm is successful in managing the IC resources using BSC, it will lead to better competitive capabilities.

To provide more support to the above findings, the operation manager at SERV6 said the following:

"The CA is the result from being strategically different from your competitors. So planning and implementing better strategic plans than competitors, [then] you are successful. For us, the BSC is our strategic plan. So by making ourselves different from [our] competitors in the way we plan, our BSC is successful and our success gives the company more competitive capabilities".

He suggests that the BSC is the strategic plan of his firm and its success will result in greater CA. From the above analysis, we can conclude that the success in BSC implementation leads to greater, supporting hypothesis H3.3B

7.17 The impact of BSC implementation success on FP

It is well recognised in the literature that the success in BSC implementation is important for firms' overall success (Iselin et al., 2008; De Geuser et al., 2009). This is supported by the findings from the questionnaire survey from this study. To strengthen this finding, the interviewees were asked if they can see an impact of the success of BSC implementation on FP. Their responses are consistent with the findings from the questionnaire survey. For example, the human resource manager of OIL2 said the following:

'The BSC manages our performance on the soft assets which are more valuable to our success. So if we implement it right and involve all parties of course, we will be successful in achieving our target and our success in managing these resources will lead to better financial and non-financial performance'.

He believes that given the importance of BSC in managing IC resources, the success in its implementation will result in better performance both financial and non-financial.

Others believe that the success in BSC implementation makes the firm more focused in achieving the firm's most important goals and targets, which then will enhance firm performance. An example of this view is presented by the marketing manager at SERV4:

> *'Yes, sure. If we are successful in BSC implementation, this makes us more focused in achieving the most important goals and strategies of the company. So that definitely will enhance our company performance.'*

The project manager at OIL2 is of the same view, but it was explained differently:

> *'Yes, the success in BSC implementation means that there is a clear picture about how the company operates. So everyone is adhering to goals and targets and it is clear where everyone is going. So for sure all that will lead to better performance for the company as a whole'.*

The below arguments are in line with the above. However, the interviewees define the success in BSC implementation differently. For example, the human resource manager at CONS1 said the following:

> *'For me, being successful in BSC implementation means that I have identified what will make me successful in running the business. So coming to the beginning of the year, if I said now this is what I want to achieve this year, and I put focus on the important targets identified by the BSC and I get everyone aligned and focus on the same. Then obviously I will be successful and obviously that will result in better overall company performance'.*

For him, the success in BSC implementation is to identify the areas of success, focus on the key areas identified, and involve everyone in the firm to work towards the same targets, which will bring better performance.

The CEO at SERV1 looked at the success in BSC implementation not only as performance measured and targets and KPIs set, but also targets achieved:

> *'To be successful in BSC implementation means that all my performance are measured across all areas, and all the targets set are achieved, and that for definite means success in all areas and success of the overall company'.*

The above analysis provides support on the impact of the success in BSC implementation on FP, thus supporting hypothesis *H3.4A*

7.18 Chapter summary

This chapter provides detailed analysis on the qualitative data collected using semi-structured interviews with participants from the questionnaire survey that were willing to be interviewed. The interview responses were analysed using the thematic approach for qualitative data analysis. The themes of the analysis are chosen according to their link to with the research hypotheses. The analysis and discussion made above are in line with the questionnaire findings. In that all the hypotheses are supported thus it provides strong support to all research hypotheses under investigation.

CHAPTER EIGHT: CONCLUSION

8.1 Introduction

This research is intended to help us understand the relationship among intellectual capital (IC), extent of balanced scorecard (BSC) implementation, BSC implementation success, firms' CA and performance. This thesis argues that the relationship between IC and FP is indirect and is mediated by the extent and success of BSC implementation, and firms' CA. The relationship among the above variables is explained by the research hypotheses, research frameworks and the research design. Due to the complexity to the main research framework, and in order to simplify the relationship, this study is divided into three research frameworks.

The first framework illustrated by the research framework presented in Figure 1.1. This framework studies the mediating impact of a firm's CA on the relationship between IC and a FP. This research contributed the first generalizable empirical evidence for the relation between the proposed variables in a new context. The second framework argued that the relationship between IC and both CA and performance is indirect but through the BSC implementation extent (see Figure 1.2 for the research framework). This research is the first of its kind to study the relation between IC, BSC implementation extent, CA and FP. The third framework focuses on studying the relationship between the extent and success of BSC implementation. It also suggests that there are success factors that affect the relationship. The framework also investigates the impact of the success in BSC implementation on both CA and FP (see Figure 1.3). This research framework adds to the literature within IC and BSC by bridging the two aspects together.

Although this research applies both a questionnaire and interview for data collection, the main research methodology is quantitative and follows the mainstream approach. The reason for using an interview is to overcome the questionnaire drawbacks and to support its findings. The study is applied to big firms that operate within the Omani market. The sample used for the questionnaire survey is 1,137 managers from low, medium and top level management of all the firms operate within the Omani market with employees of

500 or more. The research analysis conducted using SEM method by using SmartPLS 3. Whilst the main study analysis uses questionnaire to measure FP, confirmatory analysis using secondary data from firms' financial report for measuring FP was also conducted for the purpose of robustness testing.

This chapter summarizes the research findings, theories implications, research contributions, study limitations and further research suggestions and recommendations.

8.2 The research findings

As mentioned previously this study is divided into three research frameworks. The study conducted two types of analysis, i.e the main study analysis using questionnaire data for measuring FP, and the robustness test using secondary data for FP (i.e ROA, ROE and TSR). The results for robustness test are consistent with those found in the main analysis, both providing support for the research hypotheses proposed in the three research frameworks. Table 8.1 provides a summary of all the hypotheses and the impact of control variables for the main study analysis for the three research frameworks. The finding of the thee frameworks are discussed below.

The first framework examines the relationship between IC, CA and FP. It is found that IC is positively associated with both CA and FP, and CA is positively associated with FP (see section 6.2 in Chapter 6). Based on that, the analysis shows that CA partially mediates the relationship between IC and FP. The robustness test analysis (in section 6.3) provides consistent results with the main findings except in the hypothesis that proposes CA to be a mediator to the relationship between IC and FP. Instead of being a partial mediator found in the main analysis, the robustness test shows CA to be a full mediator for the relationship between IC and FP.

The second research framework examines the relationship between IC, BSC implementation extent, CA and FP. The main analysis found that IC is positively associated with BSC implementation extent, CA and FP. It also found that both BSC implementation extent and CA are positively associated and both of them are positively associated with FP. Based on that, and due to the strong link between the four variables, this study also found that there are two mediators link them together. The study found that BSC implementation extent partially mediate the relationship between IC and CA and between IC and FP. The second mediator is CA which partially mediate the relationship between BSC implementation extent and FP. The robustness test results are consistent with the main findings except the results for the mediating impact of CA on the relationships between IC and FP and between BSC implementation extent and FP, which shows that CA is fully mediating the two relationships.

The third framework investigates the relationship between IC, BSC implementation extent, BSC implementation success, the success factors, CA and FP. The main study analysis of the second and the third research frameworks provide strong support to the relationship between IC, BSC implementation extent, CA and FP. In addition to that, this research framework proved that BSC implementation extent is positively associated with the success factors, BSC implementation success, CA and FP. The success factors are found positively associated with the success in BSC implementation. As a continuation to the link between the research variables, the success in BSC implementation is also found positively associated with CA and FP. Since there is positive and strong link between all the variables under investigation, the analysis in chapter six prove that there are three mediation relationship links all the variables together. First, the study show that the success factors partially mediate the relationship between BSC implementation extent and BSC implementation success. The second mediators are the success in BSC implementation and CA which found fully mediate the relationship between BSC implementation extent and FP. Finally, the firm CA is found to fully mediate the relationship between the success in BSC implementation and FP. The robustness test results is consistent with the main findings excepts in the hypothesis that propose that CA has a mediating impact on the relationship between IC and FP. Compare to the main study findings, the confirmatory study found that CA is fully mediating the relationship between IC and FP.

The main study also controlled for firm size and age when analysing the proposed relationships. The analysis shows that firm size is not a good control variable for studying all the relationships within the three research frameworks except the relationships between IC and both CA and FP. It is found in this study that firm age is an important factor for studying these relationships as suggested by Youndt et al. (2004).

As is shown in table 8.1, it can be concluded that the research hypotheses presented in RF1, RF2 and RF3 are supported. However, using firm size as not a good control variable for all relationships, while firm age can be used as a control variable for studying the relationships between IC, CA and FP.

Table 8.1: Hypothesis testing

Hypotheses proposed	Path Coefficient β	p value	Significance	Support
First research Framework				
H1A: IC => CA	0.777	0.000	***	**Supported**
H1B: CA => FP	0.700	0.000	***	**Supported**
H1C: IC => FP	0.234	0.000	***	**Supported**
H1D (the mediating impact of CA (IC => FP)	**Partial mediator**			**Supported**
Second research Framework				
H2.1B: BSC Imp -> CA	0.207	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	0.084	0.000	***	**Supported**
H1B: CA -> FP	0.696	0.000	***	**Supported**
H2.1A: IC -> BSC Imp	0.537	0.000	***	**Supported**
H1A: IC -> CA	0.667	0.000	***	**Supported**
H1C: IC -> FP	0.179	0.000	***	**Supported**
H2.1C (the mediating impact of BSC implementation extent (IC -> CA)	**Partial mediator**			**Supported**
H2.2B (the mediating impact of BSC implementation extent (IC -> FP)	**Partial mediator**			**Supported**
H2.3A (the mediating impact of CA (BSC Imp -> FP)	**Partial mediator**			**Supported**
Third research Framework				
H3.1C: BSC Imp -> BSC Level	0.880	0.000	***	**Supported**
H3.4A: BSC Imp -> BSC Success	0.396	0.000	***	**Supported**
H2.1B: BSC Imp -> CA	0.082	0.016	**	**Supported**
H2.2A: BSC Imp -> FP	0.039	0.142	**Insignificant**	**Supported but affected by mediator**

Continue table 8.1: Hypothesis testing				
Hypotheses proposed	**Path Coefficient β**	**p value**	**Significance**	**Support**
Continue third research Framework				
H3.1B: BSC Imp -> Incentive Link	0.729	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.735	0.000	***	**Supported**
H3.2C: BSC Level -> BSC Success	0.089	0.019	**	**Supported**
H3.4B: BSC Success -> CA	0.136	0.000	***	**Supported**
H3.5A: BSC Success -> FP	0.048	0.066	**Insignificant**	**Supported but affected by mediator**
H1B: CA -> FP	0.670	0.000	***	**Supported**
H2.1A: IC -> BSC Imp	0.547	0.000	***	**Supported**
H1A: IC -> CA	0.667	0.000	***	**Supported**
H1C: IC -> FP	0.208	0.000	***	**Supported**
H3.2B: Incentive Link -> BSC Success	0.330	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.149	0.000	***	**Supported**
H3.3A (The mediating impact of management support (BSC Imp -> BSC Success)	**Partial mediator**			**Supported**
H3.3B (The mediating impact of incentive link (BSC Imp -> BSC Success)	**Partial mediator**			**Supported**
H3.3C (The mediating impact of implementing BSC at different business units (BSC Imp -> BSC Success)	**Partial mediator**			**Supported**
H3.4C (The mediating impact of the success in BSC implementation (BSC Imp -> CA)	**Partial mediator**			**Supported**
H3.4D (The mediating impact of the success in BSC implementation (BSC Imp -> FP)	**Partial mediator**			**Supported**
H3.5B (The mediating impact of CA (BSC Success -> FP)	**Full mediator**			**Supported**
Control for firm size	**Firm size is not a good control variable for all relationships**			
Control for firm age	**Firm size is a good control variable for studying the relationship between IC, CA and FP only**			

8.3 Theoretical implications

This research draws on resource based view (RBV) and agency theories. The RBV theory focuses on the accumulation of the valuable resources for better CA

(Barney, 1991). Penrose (1959) argues that in order to get the expected benefit from the firm's valuable resources, an effective combination has to be applied. As an extension to RBV, Sirmon et al. (2008) added that in spite of the advantages the firms can earn from their stock of resources, only the resources that are managed effectively contribute to their CA. The expected outcome from the RBV is in line with the agency theory. The agency theory implies that the effective use and management of strategic resources by the management (the agent) lead to better shareholders (principal) wealth. The two theories focus on the effective use and management of firm valuable resources for better FP. The three frameworks of this research are in line with the outcome of the two theories. The first framework implies that firm investment in the most strategic resources (IC) lead to higher (CA and FP which lead to higher shareholders wealth. The second framework is similar to the first framework, but include IC management as an extension. The framework implies that IC investment itself does not lead to the expected wealth unless IC resources managed effectively using the BSC and that lead to better shareholders wealth in a shape of higher CA and FP. The third framework is again an extension of the first and second framework. Compare to them, it includes the success factors and the success in BSC implementation as factors that increase the shareholders health from IC investment and their effective management using BSC.

8.4 The research contributions

This research adds new contributions to both academic and practical side. The next two sections discuss these contributions separately. It will start with the academic contributions and how it will add up to the existing literature. Then it will discuss the practical contributions and how it will help firms to improve FP.

8.4.1 Academic contributions

The academic contributions is based on the literature review. Based on the existing gaps in the literature, this research contributes to both IC and BSC implementation literature. The main academic contribution is this study main research framework. This study is the first of its kind that links IC, BSC, CA and FP.

Due to the importance of IC and BSC implementation in enhancing both firm CA and FP and consequently enhance shareholders wealth, this study add a new support to the RBV and the agency theories. That is by heavily investing in IC and managing these resources effectively both firm competitiveness (RBV theory) and shareholders wealth (agency theory) will improve.

This study is the first to investigate the mediation impact of BSC implementation extent and CA on the relationship between IC and FP in the Omani market and study the impact of the major IC elements for any organization in a multi-industry context. It also investigate the mediating impact of the success factors, BSC implementation and CA on the relation between BSC implementation extent and FP. In addition to that, this study also found that firm CA mediate the relationship between the success in BSC implementation and FP.

This study measured the research variables different than previous studies which investigated the same. It used 36 measures to measure IC level, 14 measures to CA level, 10 measures for measuring FP, use BSC implementation criteria for measuring BSC implementation extent and use the firm success in meeting the BSC implementation criterion for measuring the success in BSC implementation. It is considered the first to measure the success in BSC implementation without reflecting the firm performance. The measurement this study use is more comprehensive compare to the measures used by previous studies.

This study is the first to highlight the importance of the BSC success factors, how they contribute to the overall success in BSC implementation and these factors can mediate the impact of BSC implementation extent on the success in BSC implementation. This study add an important finding that support the importance of the success in BSC implementation for the overall firm success.

8.4.2 Practical contributions

The practical contributions are also based on the literature review. However, it provides advices and recommendation for practitioners for better management and better performance. The main practical contribution is the way this study explain the direction of value creation. This research provide a guidance for the firms to show the importance of the IC investment management to the firm competitive situation in the market and the firm overall performance. It also shows that IC does not have direct impact on FP but the impact will start first with the firm competitive abilities which is the result of successful resources management that will be reflected in the firm overall performance. It also provide firms with a list of 36 most important IC elements that was not accumulated in a single study before and this provide a guidance for the firms that interesting in accumulating these important assets.

This study highlights the importance of BSC implementation to the IC management and shows how can IC management through BSC implementation play important role in enhancing the impact of IC investment on both the firm CA and FP. This was proved by studying the mediating impact of BSC implementation extent to the relationship between IC and both CA and FP.

The study shows the firms the most important factors that can make them successful in BSC implementation. These factors are the management support, linking BSC implementation to the firm incentive plan and implementing the BSC at all firm levels. Also, by studying the mediating impact of BSC implementation success on the relationship between BSC implementation and both firm CA and FP, this study illustrate to firms how important it is to be successful in BSC implementation for both competitive abilities and overall FP.

8.5 Research limitations

This research is like all previous management accounting research for being not without limitation. The first limitation is the use of qualitative data to understand the quantitative findings only. This study used the interview data to support the questionnaire findings. However, the qualitative data can be used to explore other factors that may affect the relationships under investigation. Moreover, since the questionnaire data analysis prove that there are some indirect relationships between some of the variables and there are partial mediator for some of the relationships, interview data could be used to explore other variables that could mediate the given relationships in order reach full mediation relationship. Therefore, this study could use the qualitative more effectively in order to explore the research variables further and investigate the factors that might affect their association.

Secondly, this study used questionnaire, secondary data and interview for data collection for all variables under investigations. Some of the variables such as FP can be measured using secondary data only from the firms' financial reports. This study could have been used secondary data only for FP in order to overcome some of questionnaire survey limitations. Previous studies like (Youndt et al., 2004) and (Kamukama et al., 2011) used secondary data for measuring FP and not for robustness test only. However, the difficulty to access the firm's financial reports for some of the participated firms made it hard.

Thirdly, the study applied to large and very large firms which does not allow to control for firm's size. The results in chapter 6 show that the firm size is not a good control variables for studying all the relationship proposed by the three research frameworks. This is because all the firm's participated in the study are either large or very large and this does not allow the comparison in size.

This study applied to the firm operating in the Omani market only. The study conducted by Youndt et al., (2004) was applied to multinational industries that are different in nature and context. Applying this study to multinational firms could highlighted some important results that could not be found when applying the research to only one country like Oman.

8.6 Further research recommendations

This research focuses on the impact of IC level on the extent of BSC implementation and there is no previous study that has investigated the impact of the extent of BSC implementation on the level of investment in IC. Further study is needed to investigate this gap.

Most of the mediation relationships are partial mediation which indicate that there are other factors affecting these relationships. Therefore, further research can be conducted to highlight these factors and study their impact.

As mentioned in this study limitation that this study used questionnaire survey to measure FP for the main study. Further study could be conducted using secondary data from the firms' financial report in order to measure the firm financial performance.

Since, context found to be of an impact on the firms' level of investment in IC (Reed et al., 2006), this study can be applied to different countries instead of focussing on one country like Oman. This can highlight the importance of context in studying the proposed relationships.

The study controlled for firm size and age only. Other variables that can also be included as control variables. This study could at least control for industry and the participant management position in the firm which were excluded due to thesis length. This can highlight the importance of industry when studying the proposed relationship. It also can highlight the difference in different management level perception to the proposed relationships of this study.

Although the sample selection considers firms that give more importance to IC investment and BSC implementation, further research could be conducted by including both big and small firms in order to compare the impact of both IC investment and BSC implementation on firms' CA and performance. This type of investigation will give more weight and importance to firm size as a control variable for these relationships.

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Appendix A
A.1 Questionnaire
A.1.1 Questionnaire cover and consent letter

To: The top three management level managers
From: Ghadna Al Maskari (PhD researcher)

Subject: Participation in intellectual capital investment and management research

The main focus of this study is intellectual capital management, which represents the most valuable resources owned by firms and is considered the most important source of competitive advantage. Both academicians and practitioners know of the intellectual capital concept as either “intangible assets”, “knowledge capital” or “knowledge economy”. Intellectual capital management has become an evolutionary issue in the accounting and finance field due to its impact on firms’ competitive advantage and its overall performance. Due to its increasing importance, intellectual capital has received a considerable attention from developed financial markets. Many large European and American organizations have focused on intellectual capital investment and management as part of their annual strategic plans and used the balanced scorecard (BSC) as a strategic management tools for financial and nonfinancial (intellectual capital) performance management. The application of this strategic tool has also been found to be associated with better performance.

This study aims to explain the nature of the relationship between intellectual capital, intellectual capital management (i.e., through the use of balanced scorecard), firms' competitive advantage and performance. It focuses on the impact of intellectual capital investment and management on firms listed on the Omani stock market. It is targeting the top three management level managers as respondents. Participants are asked to give approximate measurements of their firms’ investment and involvement in the given issues.

To ensure anonymity and confidentiality for all participants, all firms will be coded according to the research requirement, so that none of the firms can be identified individually in the research. No individual firm’s data will be published and a copy of the final analysis will be made available to the participating individuals upon request.

I would therefore be grateful if you please represent your firm and respond to the attached questions. The questionnaire will take about 20 minutes and your participation is highly appreciated. I understand your hectic work schedule, but I would be grateful if you could please return the questionnaire by (date). Should you have any questions, please do not hesitate to contact me.

I am looking forward to receiving your responses and thank you for your participation.

Yours Faithfully,
Ghadna Sulaiman Al Maskari
PhD Student at University of Bradford
E-mail Address: gssalmas@bradford.ac.uk, ghadna2012@hotmail.com or ghadna2012@gmail.com.

Tel: +447818928632 (I use WhatsApp Messenger for easy communication)

A.1.2 Questionnaire content

Section I: Company and participant details:

1. Name of the Company: ....

2. Firm's number of employees: ....

3. What is your management position? (Please circle the correct answer):

a. CEO b. CFO c. HR Manager d. Marketing manager e. Operations Manager

f. Unit/Plant/Regional Manager g. Section or department manager h. Others

Please specify ____________

4. What level of management position do you occupy? (Please circle the correct answer)

a. Top level b. Middle level c. First level

Section II. Level of intellectual capital (IC)

Please rate your firm's level of achievement in the following areas. Circle the number that you think most closely represents your firm’s level of achievement according to the following scale:

1. Very low **2. low** **3. Below average** **4. Average**
5. Above average **6. High** **7. Very high** **NA. Not applicable**

Q. No.	**IC elements**	**Very low**						**Very high**	**NA**
Human capital:									
HC1	Our staff are highly skilled	1	2	3	4	5	6	7	NA
HC2	Our staff are experts at their jobs	1	2	3	4	5	6	7	NA
HC3	Our staff are innovative in generating new ideas	1	2	3	4	5	6	7	NA
HC4	Our staff are able to focus on the quality of service/products	1	2	3	4	5	6	7	NA
HC5	Our staff are sharing knowledge	1	2	3	4	5	6	7	NA
HC6	Our staff are committed to work	1	2	3	4	5	6	7	NA

Q. No.	IC elements	Very low						Very high	NA
Human capital:									
HC7	Our staff are loyal to the firm	1	2	3	4	5	6	7	NA
HC8	Our staff are highly educated	1	2	3	4	5	6	7	NA
HC9	Our staff are highly motivated	1	2	3	4	5	6	7	NA
HC10	Our staff are capable of managing work time	1	2	3	4	5	6	7	NA
HC11	Our staff are capable of utilizing resources effectively	1	2	3	4	5	6	7	NA
HC12	Our staff are highly productive	1	2	3	4	5	6	7	NA
Structural capital:									
SC1	Our brands, patents, trademarks and licenses represent our firm's knowledge.	1	2	3	4	5	6	7	NA
SC2	Our brands, patents, trademarks, copyrights and licenses are legally protected.	1	2	3	4	5	6	7	NA
SC3	There are manuals in place to describe routine activities.	1	2	3	4	5	6	7	NA
SC4	There are databases in place to manage firm activities.	1	2	3	4	5	6	7	NA
SC5	There is a job description in place for all types of jobs.	1	2	3	4	5	6	7	NA
SC6	Innovation in all firm aspects is given high importance.	1	2	3	4	5	6	7	NA
SC7	Our firm's culture represents our ways of doing business.	1	2	3	4	5	6	7	NA
SC8	Our firm has protection systems against knowledge loss.	1	2	3	4	5	6	7	NA
SC9	Our firm's organizational structure represents different responsibilities and communication levels.	1	2	3	4	5	6	7	NA
SC10	There is a quality system in place.	1	2	3	4	5	6	7	NA
SC11	There is a time utilization monitoring system in place.	1	2	3	4	5	6	7	NA
SC12	There is a resource utilization monitoring system in place.	1	2	3	4	5	6	7	NA
Relational capital:									
RC1	Our customers are satisfied.	1	2	3	4	5	6	7	NA
RC2	Our customers are loyal.	1	2	3	4	5	6	7	NA
RC3	Our customer complaints are always considered in product/service development.	1	2	3	4	5	6	7	NA
RC4	Our target is to have continuous business with our customers.	1	2	3	4	5	6	7	NA
RC5	There are clear market segments and customer profiles in place.	1	2	3	4	5	6	7	NA
RC6	We have good relationships with customers.	1	2	3	4	5	6	7	NA

Q. No.	IC elements	Very low					Very high	NA
RC7	We have good relationships with suppliers.	1	2	3	4	5	6	7	NA
RC8	We have good relationships with investors.	1	2	3	4	5	6	7	NA
RC9	We have good relationships with creditors.	1	2	3	4	5	6	7	NA
RC10	Our brands are well known.	1	2	3	4	5	6	7	NA
RC11	Our firm has a good reputation.	1	2	3	4	5	6	7	NA
RC12	Our market share is high compared to our competitors.	1	2	3	4	5	6	7	NA

Section III. Competitive advantage (CA):

How do you rate your firm's competitive advantage compared to your competitors? Please circle the number that represents your firm's competitiveness in the following areas according to the following scale:

1. Very low **2. Low** **3. Below average** **4. Average**
5. Above average **6. High** **7. Very high** **NA. Not applicable**

Q. No.	CA measure	Very Low						Very High	NA
CA1	We have better staff quality compared to competitors.	1	2	3	4	5	6	7	NA
CA2	Our firm has better managerial capabilities compared to competitors.	1	2	3	4	5	6	7	NA
CA3	There is continuous innovation for products/services.	1	2	3	4	5	6	7	NA
CA4	It is difficult for our competitors to imitate our strategies.	1	2	3	4	5	6	7	NA
CA5	We are providing better customer service compared to competitors.	1	2	3	4	5	6	7	NA
CA6	We have better products/service quality compared to competitors.	1	2	3	4	5	6	7	NA
CA7	We have better on-time delivery of goods and services compared to competitors.	1	2	3	4	5	6	7	NA
CA8	We have better brand awareness compared to competitors.	1	2	3	4	5	6	7	NA
CA9	We are easily obtaining external funding and financing.	1	2	3	4	5	6	7	NA

Q. No.	CA measure	Very Low						Very High	NA
CA10	We are easily gaining government support and approval for all projects.	1	2	3	4	5	6	7	NA
CA11	Our production/service cost is lower compared to competitors.	1	2	3	4	5	6	7	NA
CA12	Our selling price to the end users is reasonable compared to competitors	1	2	3	4	5	6	7	NA
CA13	Our firm is profitable compared to competitors.	1	2	3	4	5	6	7	NA
CA14	Our firm is considered the first mover in all industry-related innovation.	1	2	3	4	5	6	7	NA

Section IV. Firm performance (FP):

How do you rate your firm's current performance? Please circle the number that most closely represents your firm's performance according to the given scales.

1. Very low **2. Low** **3. Below average** **4. Average**
5. Above average **6. High** **7. Very high** **NA. Not applicable**

Q. No.	Performance measures	Very low						Very high
Market-based measures								
FP1	Stock return	1	2	3	4	5	6	7
FP2	Share price	1	2	3	4	5	6	7
FP3	Overall market performance	1	2	3	4	5	6	7
Accounting-based measures								
FP4	Return on assets	1	2	3	4	5	6	7
FP5	Return on investment	1	2	3	4	5	6	7
FP6	Sales growth	1	2	3	4	5	6	7
FP7	Profit growth	1	2	3	4	5	6	7
FP8	Overall financial performance	1	2	3	4	5	6	7
Operation-based measures:								
FP9	Capacity utilization	1	2	3	4	5	6	7
FP10	Customer satisfaction	1	2	3	4	5	6	7
FP11	Product quality	1	2	3	4	5	6	7
FP12	Success rate in launching new products	1	2	3	4	5	6	7
FP13	Overall operational performance	1	2	3	4	5	6	7

Section V. Balanced Scorecard Implementation

The balance scorecard (BSC) framework is provided in Figure I for information. The following questions relate to the implementation of BSC framework:

BSC1. Does your firm use the BSC framework to measure performance and/or as a management tool? (Circle the correct answer).

Yes **No**

BSC2. If your answer to question BSC1 above is No, please specify which framework you apply to measure or manage both financial and non-financial performance instead.

....

BSC3. If your answer to question BSC1 above is Yes, when did your firm first implement the BSC framework?

a. 1 to 3 years ago b. 4 to 6 years ago c. 7 to 9 years ago d. 10 to 12 years ago

e. More than 12 years ago

BSC4. To what extent is the BSC implemented at the following levels of your firm? Please circle the answer that represents your firm's level of implementation according to the following scale:

1. Not implemented	**2. Low implementation**	**3. Below average implementation**	**4. Average implementation**
5. Above average implementation	**6. High implementation**	**7. Very high implementation**	

Q. No.	The firm level	Not implemented					Very high implementation
BSCL1	At the corporate level only (only top management involved)	1	2	3	4	5	6	7
BSCL2	Unit or branch levels	1	2	3	4	5	6	7
BSCL3	Department levels	1	2	3	4	5	6	7
BSCL4	Individual staff levels	1	2	3	4	5	6	7

BSC5. To what extent does your firm consider the following areas in BSC implementation? (See the BSC framework in figure B of the appendix). Circle the number that represents your firm's extent of implementation according to the following scale:

1. Not implemented	**2. Low implementation**	**3. Below average implementation**	**4. Average implementation**
5. Above average implementation	**6. High implementation**	**7. Very high implementation**	

Q. No.	Measure	Not implemented						Very highly implementation
BSCI1	Both important financial and non-financial performance are measured. (see note 1 and figure B for BSC framework in the appendix)	1	2	3	4	5	6	7
BSCI2	There are cause-and-effect relationships between financial and non-financial performance measures in use (see note 2 in the appendix).	1	2	3	4	5	6	7
BSCI3	There is an alignment between the firm's strategies and the performance measures.	1	2	3	4	5	6	7
BSCI4	There are targets set to all performance measures in use.	1	2	3	4	5	6	7
BSCI5	There is a link between the achievement of targets set and the firm's reward system.	1	2	3	4	5	6	7

BSC6. What type of support do you provide for the implementation of BSC in your firm? (Circle the answers that apply to you; you can choose more than one answer).

a. Involved with BSC design and implementation

b. Involved with performance measure selection for each strategy

c. Involved with setting targets for different performance measure

d. Encouraging implementation of BSC by motivating subordinates to achieve the targets set

e. Encouraging my subordinates to design and implement their own BSC for the management of different units or activities

f. All the above

g. No support provided

BSC7. To what extent do you feel that the BSC implementation within your firm was supported by top management? Choose the level of support according to the following scale:

1. Not supported	**2. Low support**	**3. Below average support**	**4. Average support**
5. Above average support	**6. Highly supported**	**7. Very high support**	

BSC7	Not supported						Very high support
	1	2	3	4	5	6	7

BSC8. To what extent do you feel that top management was involved with your firm's BSC implementation? Choose your top management's involvement according to the following scale:

1. Not involved	**2. Low involvement**	**3. Below average involvement**	**4. Average involvement**
5. Above average involvement	**6. High involvement**	**7. Very high involvement**	

BSC8	Not involved						Very high involvement
	1	2	3	4	5	6	7

BSC9. Does your firm link staff incentives to the achievement of the targets set within the BSC?

Yes **No**

BSC10. If your answer to the above question BSC9 is Yes, please rate to what extent your incentives plan are linked to the achievement of targets set in the BSC. Circle the correct answer according to the following scale:

1. Not linked	**2. Low linkage**	**3. Below average linkage**	**4. Average linkage**
5. Above average linkage	**6. Highly linked**	**7. Very highly linked**	

BSC10	Low linkage						Very highly linked
	1	2	3	4	5	6	7

BSC11. How do you rate your firm's success in the following areas of BSC implementation? (See the BSC framework in figure B of the appendix). Circle the correct answer according to the following scale:

1. Not successful	**2. Low success**	**3. Below average success**	**4. Average success**
5. Above average success	**6. Highly successful**	**7. Very highly successful**	

Q. No.	Measure	Not successful						Very high success
BSCS1	The measurement of both financial and non-financial performance. (see note 1 and figure B for BSC framework in the appendix)	1	2	3	4	5	6	7
BSCS2	Have cause-and-effect relationships between financial and non-financial performance measures (see note 2 in the appendix).	1	2	3	4	5	6	7
BSCS3	There is alignment between the firm's strategies and the performance measures.	1	2	3	4	5	6	7
BSCS4	There is target set to every performance measures in use.	1	2	3	4	5	6	7
BSCS5	There is a link between the achievement of targets set and the firm's reward system.	1	2	3	4	5	6	7
BSCS6	Overall success in the firm’s BSC implementation	1	2	3	4	5	6	7

Thank you for your participation and your patience.

Important Questions:

1. Have you participated in similar study within the last six months?

□ Yes I did

□ No I didn't

2. Participant is invited to participate in an interview to support the result of this survey, so please tick the right box if you wish or don't wish to participate:

□ I agree to participate

□ I don't agree to participate

A.1.2.1 Questionnaire Appendix

Notes:

1. The financial performance measures are represented by the financial perspective and the non-financial performance measures are represented by learning and growth, internal process, and customer perspectives (see figure A below for the BSC framework)

2. The cause-and-effect relationship shows how different balanced scorecard perspectives links to each other (see figure B below).

Figure A.1.1: Balanced Scorecard Framework:

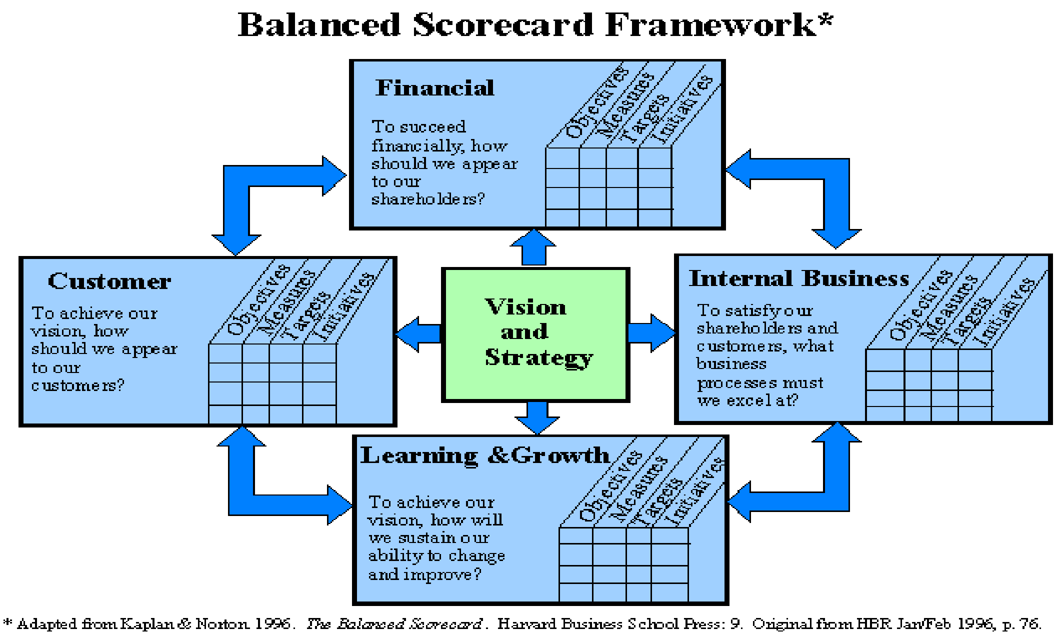
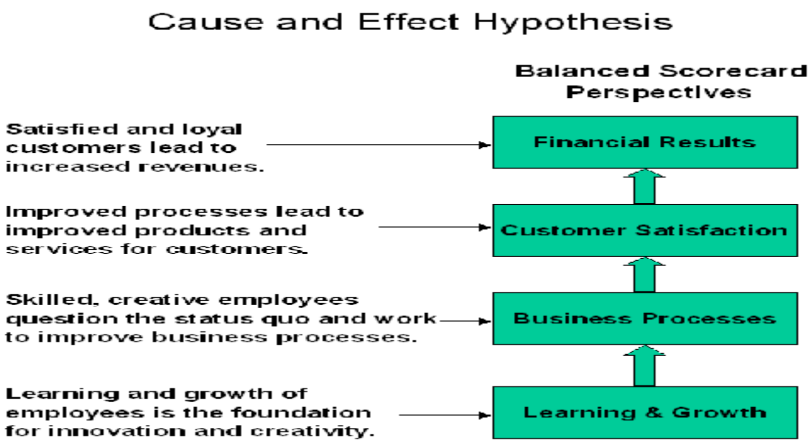


Figure A.1.2: Cause-and-effect relationship



A.2 Interview Guide

The interviews will begin with introduction of the research purpose and asking the interviewee's consent for their participation in this study. The participants' anonymity and confidentiality will be ensured before starting the interview. The interview questions will focus on the following questions:

1. Does your firm have IC?

2. Do you consider IC investment in your annual plans?

3. Do you think IC resources are important to the firm's success?

4. Do you think that your firm’s competitive advantages are the result of your investment in IC?

5. Do the firm's competitive advantages have an impact on the firm's performance?

6. Do you think IC has a direct impact on your firm's performance, or is the impact contingent on other factors?

7. Does your firm manage or measure IC?

8. What management or measurement tool does your firm use?

9. Does IC management have an impact on your firm's competitive advantages?

10. Does IC management have an impact on your firm's performance?

11. Does your firm implement the balanced scorecard as a strategic management tool?

12. Do you use BSC to manage your financial and/or nonfinancial performance?

13. Does BSC implementation have an impact on the firm's competitive advantages?

14. Does BSC implementation have an impact on your firm's performance?

15. Do you think BSC implementation affect your firm’s IC level?

16. Can you see a relation between the firm’s level of IC and BSC implementation?

17. Is your firm successful in BSC implementation?

18. What are the main factors behind the success of BSC implementation?

19. Do you support your staff with BSC implementation?

20. Do you think that it is your support of BSC implementation that led to its successful implementation?

21. At what level of the firm is BSC implemented?

22. Do you think it is better to implement the BSC at one level of the firm or at all levels?

23. Can you see a link between BSC implementation at different levels of the firm and the firm’s success in BSC implementation?

24. Is the firm’s incentive plan linked to BSC implementation?

25. Can you see a link between linking the incentive plan to BSC and your success in BSC implementation?

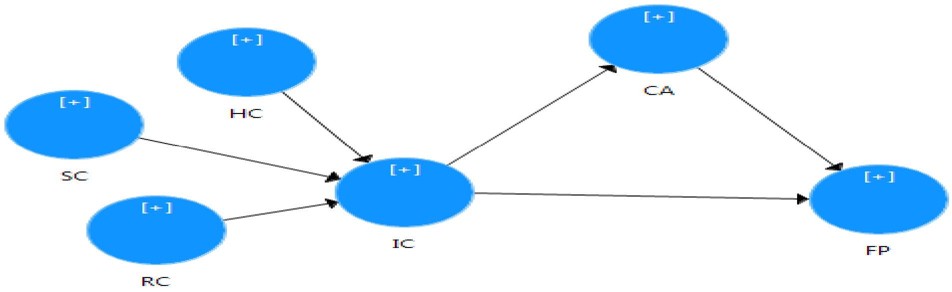
26. Does your firm’s success in BSC implementation have any impact on the firm’s overall performance?

Thank you.

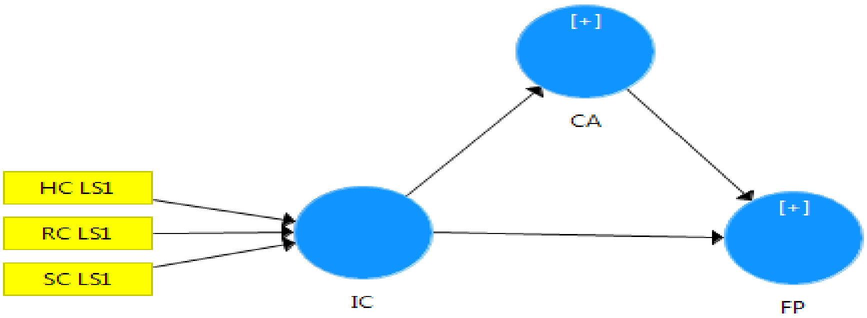
A.3 Data analysis figures and tables

Table A.3.1: Hypothesis testing				
Hypotheses proposed	**Path Coefficient β**	**p value**	**Significance**	**Support**
First research Framework				
H1A: IC => CA	0.773	0.000	***	**Supported**
H1B: CA => FP	0.703	0.000	***	**Supported**
H1C: IC => FP	0.232	0.000	***	**Supported**
Second research Framework				
H2.1B: BSC Imp -> CA	0.233	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	0.099	0.000	***	**Supported**
H1B: CA -> FP	0.684	0.000	***	**Supported**
H2.1A: IC -> BSC Imp	0.561	0.000	***	**Supported**
H1A: IC -> CA	0.646	0.000	***	**Supported**
H1C: IC -> FP	0.179	0.000	***	**Supported**
Third research Framework				
H3.1C: BSC Imp -> BSC Level	0.878	0.000	***	**Supported**
H3.4A: BSC Imp -> BSC Success	0.411	0.000	***	**Supported**
H2.1B: BSC Imp -> CA	0.116	0.003	**	**Supported**
H2.2A: BSC Imp -> FP	**0.051**	**0.074**	**Insignificant**	**Supported but affected by mediator**
H3.1B: BSC Imp -> Incentive Link	0.737	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.732	0.000	***	**Supported**
H3.2C: BSC Level -> BSC Success	0.099	0.019	**	**Supported**
H3.4B: BSC Success -> CA	0.122	0.001	***	**Supported**
H3.5A: BSC Success -> FP	**0.052**	**0.063**	**Insignificant**	**Supported but affected by mediator**
H1B: CA -> FP	0.659	0.000	***	**Supported**
H2.1A: IC -> BSC Imp	0.567	0.000	***	**Supported**
H1A: IC -> CA	0.653	0.000	***	**Supported**
H1C: IC -> FP	0.210	0.000	***	**Supported**
H3.2B: Incentive Link -> BSC Success	0.295	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.165	0.000	***	**Supported**

Figure A.3.1: First and second order measurement model evaluation (RF1)

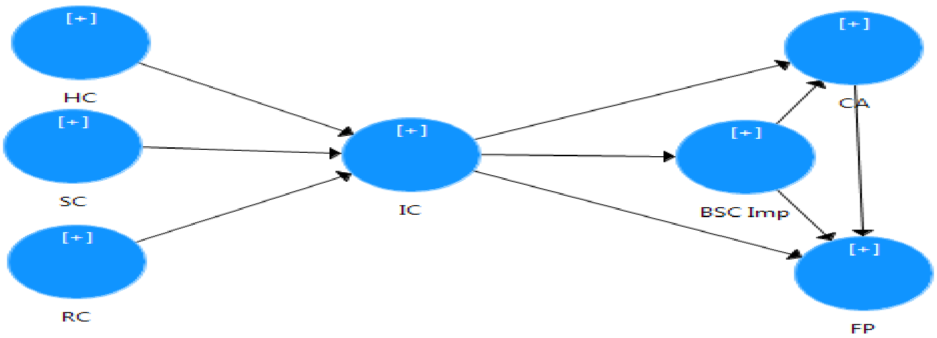


A: First stage (first order analysis)

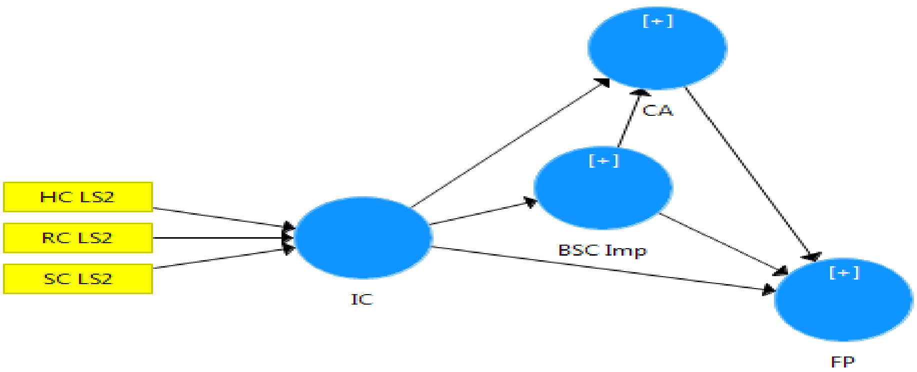


B: The second stage (second order analysis)

Figure A.3.2: First and second order structural model evaluation (RF2)

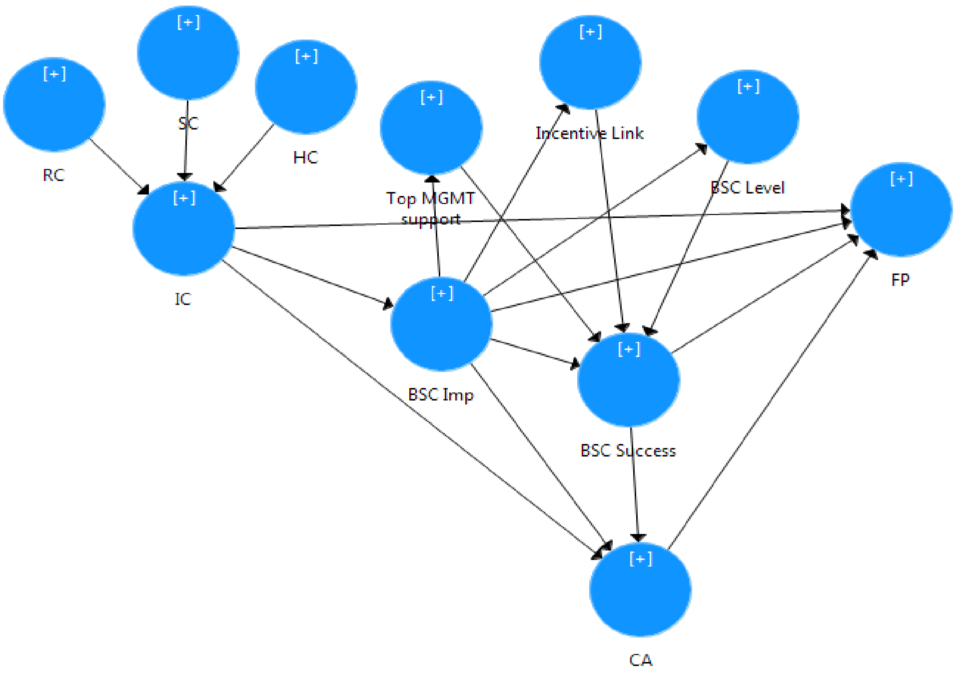


A: First stage (first order analysis)

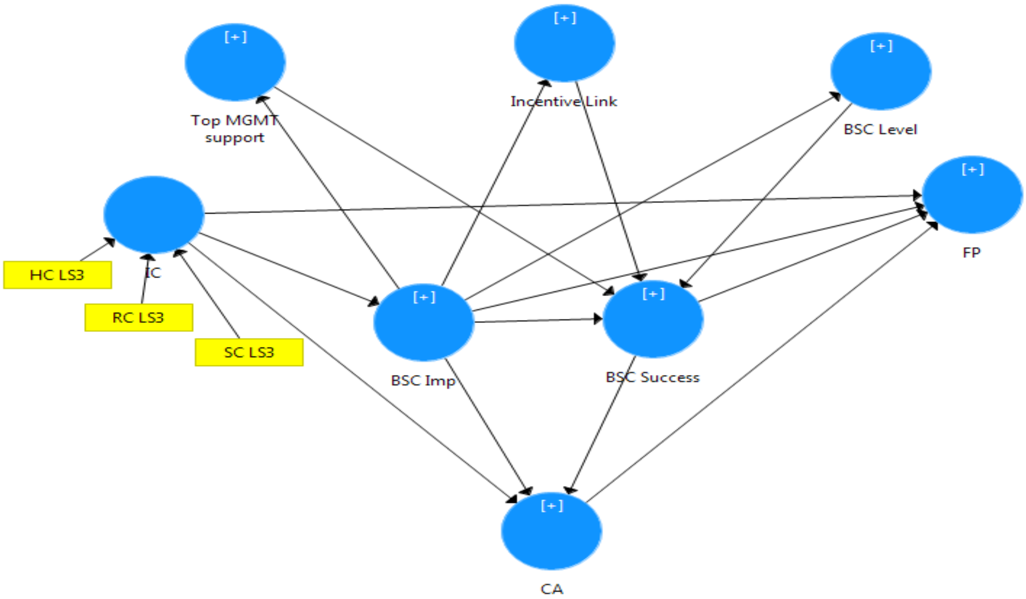


B: The second stage (second order analysis)

Figure A.3.3: First and second order structural model evaluation (RF3)



A: First stage (first order analysis)



B: The second stage (second order analysis)

Table A.3.2: Hypothesis testing with HC				
Hypotheses proposed	**Path Coefficient β**	**P Values**	**Significances**	**Support**
First research framework				
H1A: HC => CA	0.772	0.000	***	**Supported**
H1B: CA => FP	0.734	0.000	***	**Supported**
H1C: HC => FP	0.192	0.000	***	**Supported**
Second research framework				
H2.1B: BSC Imp -> CA	0.214	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	0.083	0.000	***	**Supported**
H1B: CA -> FP	0.703	0.000	***	**Supported**
H2.1A: HC -> BSC Imp	0.535	0.000	***	**Supported**
H1A: HC -> CA	0.657	0.000	***	**Supported**
H1C: HC -> FP	0.172	0.000	***	**Supported**
Third research framework				
H3.1C: BSC Imp -> BSC Level	0.866	0.000	***	**Supported**
H3.3A: BSC Imp -> BSC Success	0.402	0.000	***	**Supported**
H2.1B: BSC Imp -> CA	0.081	0.032	**	**Supported**
H2.2A: BSC Imp -> FP	0.039	0.143	**Insignificant**	**Supported but affected by mediator**
H3.1B: BSC Imp -> Incentive Link	0.729	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.735	0.000	***	**Supported**
H3.1C: BSC Level -> BSC Success	0.083	0.021	**	**Supported**
H3.4B: BSC Success -> CA	0.175	0.000	***	**Supported**

Continue table A.3.2: Hypothesis testing with HC				
Hypotheses proposed	**Path Coefficient β**	**P Values**	**Significances**	**Support**
Continue third research framework				
H3.5A: BSC Success -> FP	0.058	0.037	***	**Supported**
H1B: CA -> FP	0.694	0.000	***	**Supported**
H2.1A: HC -> BSC Imp	0.524	0.000	***	**Supported**
H1A: HC -> CA	0.640	0.000	***	**Supported**
H1C: HC -> FP	0.173	0.000	***	**Supported**
H3.2B: Incentive Link -> BSC Success	0.331	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.150	0.000	***	**Supported**

Table A.3.3: Hypothesis testing with SC				
Hypotheses proposed	**Path Coefficient β**	**P Values**	**Significances**	**Support**
First research framework				
H1A: SC => CA	0.774	0.000	***	**Supported**
H1B: CA => FP	0.689	0.000	***	**Supported**
H1C: SC => FP	0.232	0.000	***	**Supported**
Second research framework				
H2.1B: BSC Imp -> CA	0.183	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	0.075	0.000	***	**Supported**
H1B: CA -> FP	0.682	0.000	***	**Supported**
H2.1A: SC -> BSC Imp	0.560	0.000	***	**Supported**

Continue table A.3.3: Hypothesis testing with SC				
Hypotheses proposed	**Path Coefficient β**	**P Values**	**Significances**	**Support**
H1A: SC -> CA	0.682	0.000	***	**Supported**
H1C: SC -> FP	0.201	0.000	***	**Supported**
Third research framework				
H3.1C: BSC Imp -> BSC Level	0.866	0.000	***	**Supported**
H3.3A: BSC Imp -> BSC Success	0.402	0.000	***	**Supported**
H2.1B: BSC Imp -> CA	0.086	0.013	**	**Supported**
H2.2A: BSC Imp -> FP	0.040	0.126	**Insignificant**	**Supported but affected by mediator**
H3.1B: BSC Imp -> Incentive Link	0.729	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.735	0.000	***	**Supported**
H3.1C: BSC Level -> BSC Success	0.083	0.031	***	**Supported**
H3.4B: BSC Success -> CA	0.135	0.000	***	**Supported**
H3.5A: BSC Success -> FP	0.048	0.084	**Insignificant**	**Supported but affected by mediator**
H1B: CA -> FP	0.676	0.000	***	**Supported**
H2.1A: SC -> BSC Imp	0.331	0.000	***	**Supported**
H1A: SC -> CA	0.546	0.000	***	**Supported**
H1C: SC -> FP	0.664	0.000	***	**Supported**
H3.2B: Incentive Link -> BSC Success	0.201	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.150	0.000	***	**Supported**

Table A.3.4: Hypothesis testing with RC				
Hypotheses proposed	**Path Coefficient β**	**P Values**	**Significances**	**Support**
First research Framework				
H1A: RC => CA	0.773	0.000	***	**Supported**
H1B: CA => FP	0.657	0.000	***	**Supported**
H1C: RC => FP	0.274	0.000	***	**Supported**
Second research Framework				
H2.1B: BSC Imp -> CA	0.198	0.000	***	**Supported**
H2.2A: BSC Imp -> FP	0.081	0.000	***	**Supported**
H1B: CA -> FP	0.646	0.000	***	**Supported**
H2.1A: RC -> BSC Imp	0.533	0.000	***	**Supported**
H1A: RC -> CA	0.683	0.000	***	**Supported**
H1C: RC -> FP	0.241	0.000	***	**Supported**
Third research Framework				
H3.1C: BSC Imp -> BSC Level	0.867	0.000	***	**Supported**
H3.3A: BSC Imp -> BSC Success	0.401	0.000	**	**Supported**
H2.1B: BSC Imp -> CA	0.075	0.020	**	**Supported**
H2.2A: BSC Imp -> FP	0.036	0.186	**Insignificant**	**Supported but affected by mediator**
H3.1B: BSC Imp -> Incentive Link	0.729	0.000	***	**Supported**
H3.1A: BSC Imp -> Top MGMT support	0.736	0.000	**	**Supported**
H3.1C: BSC Level -> BSC Success	0.084	0.039	**	**Supported**
H3.4B: BSC Success -> CA	0.163	0.000	***	**Supported**

Continue table A.3.4: Hypothesis testing with RC				
Hypotheses proposed	**Path Coefficient β**	**P Values**	**Significances**	**Support**
H3.5A: BSC Success -> FP	0.059	0.028	**	**Supported**
H1B: CA -> FP	0.639	0.000	***	**Supported**
H2.1A: RC -> BSC Imp	0.331	0.000	***	**Supported**
H1A: RC -> CA	0.522	0.000	***	**Supported**
H1C: RC -> FP	0.667	0.000	***	**Supported**
H3.2B: Incentive Link -> BSC Success	0.241	0.000	***	**Supported**
H3.2A:Top MGMT support ->BSC Success	0.150	0.000	***	**Supported**

Table A.3.5: Collinearity test - tolerance and variance inflation factor (VIF) values (first order analysis)			
Construct	**Indicator**	**Tolerance**	**VIF**
HC	**HC1**	0.383	2.608
	HC2	0.562	1.780
	HC3	0.373	2.681
	HC4	0.364	2.747
	HC5	0.351	2.851
	HC6	0.694	1.441
	HC7	0.387	2.585
	HC8	0.325	3.074
	HC9	0.348	2.875
	HC10	0.313	3.199
	HC11	0.304	3.293
	HC12	0.310	3.221
RC	**RC1**	0.276	3.628
	RC2	0.289	3.460
	RC3	0.304	3.293
	RC4	0.291	3.437
	RC5	0.409	2.445
	RC6	0.304	3.286
	RC7	0.283	3.529
	RC8	0.856	1.168
	RC9	0.308	3.243
	RC10	0.345	2.898
	RC11	0.299	3.344
	RC12	0.376	2.663
SC	**SC1**	0.246	4.057
	SC2	0.254	3.935
	SC3	0.313	3.195
	SC4	0.267	3.752
	SC5	0.304	3.288
	SC6	0.305	3.283
	SC7	0.332	3.011
	SC8	0.287	3.490
	SC9	0.289	3.460
	SC10	0.305	3.278
	SC11	0.339	2.952
	SC12	0.334	2.991

Continue table A.3.5: Collinearity test - tolerance and variance inflation factor (VIF) values (First order analysis)			
Construct	**Indicator**	**Tolerance**	**VIF**
CA	**CA1**	0.289	3.463
	CA2	0.223	4.492
	CA3	0.295	3.391
	CA4	0.262	3.824
	CA5	0.333	3.003
	CA6	0.281	3.558
	CA7	0.260	3.848
	CA8	0.280	3.576
	CA9	0.360	2.776
	CA10	0.456	2.193
	CA11	0.312	3.205
	CA12	0.407	2.454
	CA13	0.445	2.246
	CA14	0.405	2.470
FP	**ROA**	0.416	2.405
	ROE	0.537	1.861
	TSR	0.702	1.425
BSC implementation extent	**BSCImp1**	0.511	1.958
	BSCImp2	0.307	3.255
	BSCImp3	0.402	2.490
	BSCImp4	0.387	2.583
	BSCImp5	0.768	1.302
Success in BSC Implementation	**BSCSucs1**	0.395	2.534
	BSCSucs2	0.562	1.778
	BSCSucs3	0.717	1.395
	BSCSucs4	0.749	1.336
	BSCSucs5	0.697	1.434
	BSCSucs6	0.582	1.718
BSC Implementation at different levels of the firm	**BSCL1**	0.234	4.265
	BSCL2	0.212	4.711
	BSCL3	0.594	1.684
	BSCL4	0.337	2.967
Management support	**Involvement**	0.923	1.083
	Support	0.923	1.083
Incentive Link	**Incentive Link**	1.000	1.000

Table A.3.6: Collinearity test - tolerance and variance inflation factor (VIF) values (second order analysis)			
Construct	**Indicators**	**Tolerance**	**VIF**
First research framework			
IC	**HC LS1**	0.826	1.210
	RC LS1	0.537	1.862
	SC LS1	0.576	1.737
Second research framework			
IC	**HC LS2**	0.637	1.569
	RC LS2	0.834	1.199
	SC LS2	0.612	1.633
Third research framework			
IC	**HC LS3**	0.476	2.101
	RC LS3	0.565	1.769
	SC LS3	0.529	1.889

Table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
First research framework							
HC	HC1	0.249	0.000	***	0.854	0.000	***
	HC2	**0.052**	**0.225**	**Insignificant**	**0.636**	**0.000**	***
	HC3	0.176	0.000	***	0.787	0.000	***
	HC4	0.179	0.000	***	0.838	0.000	***
	HC5	0.147	0.001	***	0.825	0.000	***
	HC6	**0.031**	**0.315**	**Insignificant**	**0.541**	**0.000**	***
	HC7	0.136	0.009	***	0.776	0.000	***
	HC8	0.145	0.000	***	0.803	0.000	***
	HC9	**0.049**	**0.286**	**Insignificant**	**0.781**	**0.000**	***
	HC10	**0.061**	**0.201**	**Insignificant**	**0.826**	**0.000**	***
	HC11	0.194	0.000	***	0.870	0.000	***
	HC12	**0.070**	**0.168**	**Insignificant**	**0.807**	**0.000**	***
RC	RC1	0.179	0.000	***	0.868	0.000	***
	RC2	0.209	0.000	***	0.837	0.000	***
	RC3	0.201	0.000	***	0.867	0.000	***
	RC4	**0.003**	**0.961**	**Insignificant**	**0.815**	**0.000**	***
	RC5	0.091	0.026	***	0.745	0.000	***
	RC6	**0.009**	**0.850**	**Insignificant**	**0.806**	**0.000**	***
	RC7	0.206	0.000	***	0.875	0.000	***
	RC8	**-0.026**	**0.352**	**Insignificant**	**0.677**	**0.000**	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue first research framework							
RC	RC9	0.139	0.002	***	0.847	0.000	***
	RC10	**0.021**	**0.667**	**Insignificant**	**0.787**	**0.000**	***
	RC11	**0.073**	**0.087**	**Insignificant**	**0.817**	**0.000**	***
	RC12	0.203	0.000	***	0.851	0.000	***
SC	SC1	0.168	0.000	***	0.834	0.000	***
	SC2	0.213	0.000	*******	0.799	0.000	***
	SC3	0.177	0.007	*******	0.783	0.000	***
	SC4	**0.063**	**0.164**	**Insignificant**	**0.848**	**0.000**	***
	SC5	0.144	0.002	*******	0.849	0.000	***
	SC6	0.136	0.007	***	0.858	0.000	***
	SC7	0.180	0.000	***	0.838	0.000	***
	SC8	0.113	0.011	**	0.838	0.000	***
	SC9	0.172	0.000	***	0.858	0.000	***
	SC10	**-0.042**	**0.406**	**Insignificant**	**0.792**	**0.000**	***
	SC11	0.126	0.006	***	0.805	0.000	***
	SC12	**0.086**	**0.053**	**Insignificant**	**0.797**	**0.000**	***
CA	CA1	0.315	0.002	***	0.880	0.000	***
	CA2	**-0.031**	**0.783**	**Insignificant**	**0.852**	**0.000**	***
	CA3	0.195	0.000	*******	0.835	0.000	***
	CA4	0.165	0.002	*******	0.855	0.000	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue first research framework							
	CA5	**0.024**	**0.777**	**Insignificant**	**0.769**	**0.000**	***
	CA6	0.233	0.000	***	0.806	0.000	***
	CA7	**0.142**	**0.151**	**Insignificant**	**0.840**	**0.000**	***
	CA8	0.189	0.000	***	0.846	0.000	***
	CA9	**0.004**	**0.961**	**Insignificant**	**0.758**	**0.000**	***
	CA10	0.197	0.000	***	0.749	0.000	***
	CA11	**0.082**	**0.354**	**Insignificant**	**0.805**	**0.000**	***
	CA12	**0.007**	**0.916**	**Insignificant**	**0.726**	**0.000**	***
	CA13	0.171	0.020	**	0.790	0.000	***
	CA14	0.244	0.003	***	0.722	0.000	***
FP	ROA	**0.536**	**0.213**	**Insignificant**	**0.688**	**0.000**	***
	ROE	0.311	0.000	***	0.754	0.000	***
	TSR	0.761	0.043	**	0.846	0.000	***
Second research framework							
HC	HC1	0.250	0.001	***	0.847	0.000	***
	HC2	0.233	0.000	***	0.640	0.000	***
	HC3	0.169	0.004	***	0.797	0.000	***
	HC4	**0.130**	**0.057**	**Insignificant**	**0.818**	**0.000**	***
	HC5	0.155	0.042	**	0.824	0.000	***
	HC6	**0.059**	**0.225**	**Insignificant**	**0.561**	**0.000**	***
	HC7	0.188	0.000	***	0.769	0.000	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
HC	HC8	0.302	0.000	***	0.789	0.000	***
	HC9	0.184	0.000	***	0.759	0.000	***
	HC10	**0.054**	**0.391**	**Insignificant**	**0.824**	**0.000**	***
	HC11	0.204	0.003	***	0.877	0.000	***
	HC12	0.169	0.028	**	0.840	0.000	***
RC	RC1	0.193	0.005	***	0.865	0.000	***
	RC2	**0.066**	**0.419**	**Insignificant**	**0.837**	**0.000**	***
	RC3	0.195	0.009	***	0.845	0.000	***
	RC4	0.255	0.000	***	0.772	0.000	***
	RC5	**0.050**	**0.423**	**Insignificant**	**0.717**	**0.000**	***
	RC6	0.276	0.000	***	0.781	0.000	***
	RC7	0.196	0.008	***	0.860	0.000	***
	RC8	0.142	0.032	**	0.589	0.000	***
	RC9	**0.094**	**0.166**	**Insignificant**	**0.818**	**0.000**	***
	RC10	**0.042**	**0.480**	**Insignificant**	**0.775**	**0.000**	***
	RC11	**0.041**	**0.537**	**Insignificant**	**0.785**	**0.000**	***
	RC12	0.363	0.000	***	0.897	0.000	***
SC	SC1	0.201	0.005	***	0.847	0.000	***
	SC2	0.213	0.000	***	0.804	0.000	***
	SC3	**0.034**	**0.629**	**Insignificant**	**0.758**	**0.000**	***
	SC4	**-0.026**	**0.722**	**Insignificant**	**0.819**	**0.000**	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
SC	SC5	0.170	0.010	**	0.854	0.000	***
	SC6	0.146	0.026	**	0.862	0.000	***
	SC7	0.160	0.002	***	0.830	0.000	***
	SC8	0.149	0.043	**	0.841	0.000	***
	SC9	**0.149**	**0.081**	**Insignificant**	**0.851**	**0.000**	***
	SC10	0.179	0.001	***	0.786	0.000	***
	SC11	**0.099**	**0.119**	**Insignificant**	**0.797**	**0.000**	***
	SC12	0.134	0.033	**	0.806	0.000	***
CA	CA1	0.292	0.001	***	0.872	0.000	***
	CA2	0.129	0.043	**	0.853	0.000	***
	CA3	**0.147**	**0.078**	**Insignificant**	**0.842**	**0.000**	***
	CA4	**0.167**	**0.098**	**Insignificant**	**0.853**	**0.000**	***
	CA5	0.232	0.000	***	0.767	0.000	***
	CA6	**0.050**	**0.525**	**Insignificant**	**0.803**	**0.000**	***
	CA7	0.255	0.000	***	0.820	0.000	***
	CA8	0.195	0.000	***	0.851	0.000	***
	CA9	0.213	0.000	***	0.742	0.000	***
	CA10	**0.113**	**0.099**	**Insignificant**	**0.749**	**0.000**	***
	CA11	**0.099**	**0.224**	**Insignificant**	**0.817**	**0.000**	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
CA	CA12	0.301	0.000	***	0.734	0.000	***
	CA13	0.195	0.005	***	0.801	0.000	***
	CA14	**0.007**	**0.933**	**Insignificant**	**0.738**	**0.000**	***
FP	ROA	**0.471**	**0.201**	**Insignificant**	**0.689**	**0.004**	***
	ROE	0.266	0.000	***	0.599	0.000	***
	TSR	0.783	0.007	*******	0.952	0.000	***
BSC Implementation Extent	BSCImp1	**0.136**	**0.180**	**Insignificant**	**0.759**	**0.000**	***
	BSCImp2	0.743	0.000	***	0.983	0.000	***
	BSCImp3	0.176	0.032	**	0.806	0.000	***
	BSCImp4	**0.064**	**0.632**	**Insignificant**	**0.792**	**0.000**	***
	BSCImp5	0.329	0.000	*******	0.772	0.000	***
Third research framework							
HC	HC1	0.243	0.001	***	0.843	0.000	***
	HC2	**0.062**	**0.362**	**Insignificant**	**0.640**	**0.000**	***
	HC3	0.155	0.003	***	0.798	0.000	***
	HC4	**0.128**	**0.053**	**Insignificant**	**0.817**	**0.000**	***
	HC5	0.147	0.027	******	0.825	0.000	***
	HC6	0.186	0.000	***	0.562	0.000	***
	HC7	0.211	0.000	*******	0.772	0.000	***
	HC8	0.179	0.000	*******	0.786	0.000	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
HC	HC9	**0.123**	**0.056**	**Insignificant**	**0.760**	**0.000**	***
	HC10	**0.051**	**0.420**	**Insignificant**	**0.824**	**0.000**	***
	HC11	0.195	0.008	***	0.875	0.000	***
	HC12	0.181	0.013	**	0.844	0.000	***
RC	RC1	0.190	0.005	***	0.866	0.000	***
	RC2	**0.085**	**0.293**	**Insignificant**	**0.843**	**0.000**	***
	RC3	0.198	0.007	***	0.845	0.000	***
	RC4	0.244	0.000	*******	0.767	0.000	***
	RC5	**0.047**	**0.452**	**Insignificant**	**0.716**	**0.000**	***
	RC6	**0.011**	**0.856**	**Insignificant**	**0.785**	**0.000**	***
	RC7	0.194	0.003	***	0.860	0.000	***
	RC8	0.311	0.000	*******	0.634	0.001	***
	RC9	0.215	0.000	*******	0.811	0.000	***
	RC10	**0.039**	**0.556**	**Insignificant**	**0.770**	**0.000**	***
	RC11	0.183	0.024	******	0.783	0.000	***
	RC12	0.362	0.000	***	0.898	0.000	***
SC	SC1	0.197	0.005	***	0.845	0.000	***
	SC2	0.192	0.016	**	0.802	0.000	***
	SC3	**0.028**	**0.667**	**Insignificant**	**0.756**	**0.000**	***
	SC4	0.208	0.000	***	0.817	0.000	***
	SC5	0.166	0.018	******	0.851	0.000	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
SC	SC6	**0.135**	**0.056**	**Insignificant**	**0.859**	**0.000**	***
	SC7	0.165	0.002	***	0.833	0.000	***
	SC8	0.154	0.032	**	0.841	0.000	***
	SC9	**0.152**	**0.055**	**Insignificant**	**0.850**	**0.000**	***
	SC10	0.231	0.000	*******	0.788	0.000	***
	SC11	**0.110**	**0.083**	**Insignificant**	**0.802**	**0.000**	***
	SC12	0.137	0.014	**	0.810	0.000	***
CA	CA1	0.292	0.001	***	0.873	0.000	***
	CA2	**0.069**	**0.403**	**Insignificant**	**0.867**	**0.000**	***
	CA3	**0.135**	**0.068**	**Insignificant**	**0.836**	**0.000**	***
	CA4	0.165	0.044	******	0.854	0.000	***
	CA5	0.245	0.000	***	0.777	0.000	***
	CA6	**0.034**	**0.638**	**Insignificant**	**0.801**	**0.000**	***
	CA7	**0.043**	**0.602**	**Insignificant**	**0.818**	**0.000**	***
	CA8	0.143	0.015	**	0.842	0.000	***
	CA9	**0.098**	**0.054**	**Insignificant**	**0.729**	**0.000**	***
	CA10	**0.076**	**0.215**	**Insignificant**	**0.730**	**0.000**	***
	CA11	0.222	0.000	*******	0.816	0.000	***
	CA12	0.239	0.000	***	0.733	0.000	***
	CA13	0.213	0.002	***	0.808	0.000	***
	CA14	**0.027**	**0.700**	**Insignificant**	**0.745**	**0.000**	***

Continue table A.3.7: Outer weights and significance test (First order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
FP	ROA	0.387	0.000	***	0.619	0.015	***
	ROE	0.169	0.026	**	0.577	0.034	***
	TSR	0.847	0.005	***	0.963	0.000	***
BSC Implementation Extent	BSCImp1	0.171	0.002	**	0.781	0.000	***
	BSCImp2	0.584	0.000	***	0.967	0.000	***
	BSCImp3	0.183	0.002	***	0.827	0.000	***
	BSCImp4	0.178	0.006	**	0.843	0.000	***
	BSCImp5	**0.000**	**0.999**	**Insignificant**	**0.721**	**0.000**	***
BSC Implementation at different levels	BSCL1	0.313	0.000	***	0.924	0.000	***
	BSCL2	0.315	0.000	***	0.933	0.000	***
	BSCL3	0.200	0.000	***	0.742	0.000	***
	BSCL4	0.298	0.000	***	0.901	0.000	***
BSC Implementation Success	BSCSucs1	0.473	0.000	***	0.918	0.000	***
	BSCSucs2	0.382	0.000	***	0.847	0.000	***
	BSCSucs3	0.114	0.029	**	0.584	0.000	***
	BSCSucs4	**0.090**	**0.061**	**Insignificant**	**0.550**	**0.000**	***
	BSCSucs5	0.173	0.001	***	0.644	0.000	***
	BSCSucs6	**0.025**	**0.670**	**Insignificant**	**0.628**	**0.000**	***
Top MGMT Support	Involvement	0.913	0.000	***	0.976	0.000	***
	Support	0.227	0.009	***	0.722	0.000	***

Table A.3.8: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
First research framework							
IC	HC LS1	**0.040**	**0.513**	**Insignificant**	**0.655**	**0.00**	***
	RC LS1	0.781	0.000	***	0.976	0.00	***
	SC LS1	0.276	0.008	***	0.795	0.00	***
CA	CA1	**0.206**	**0.064**	**Insignificant**	**0.851**	**0.00**	***
	CA2	0.199	0.003	***	0.832	0.00	***
	CA3	0.233	0.000	***	0.785	0.00	***
	CA4	0.242	0.017	**	0.868	0.00	***
	CA5	**0.067**	**0.432**	**Insignificant**	**0.788**	**0.00**	***
	CA6	0.311	0.000	***	0.790	0.00	***
	CA7	0.169	0.022	**	0.824	0.00	***
	CA8	**0.046**	**0.599**	**Insignificant**	**0.834**	**0.00**	***
	CA9	**0.016**	**0.839**	**Insignificant**	**0.764**	**0.00**	***
	CA10	0.182	0.023	**	0.765	0.00	***
	CA11	**0.073**	**0.420**	**Insignificant**	**0.807**	**0.00**	***
	CA12	0.189	0.018	**	0.798	0.00	***
	CA13	**0.140**	**0.065**	**Insignificant**	**0.785**	**0.00**	***
	CA14	0.219	0.000	***	0.738	0.00	***
FP	ROA	0.185	0.031	**	0.710	0.00	***
	ROE	0.723	0.000	***	0.949	0.00	***
	TSR	**0.378**	**0.066**	**Insignificant**	**0.803**	**0.00**	***

Continue table A.3.8: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Second research framework							
IC	HC LS2	0.947	0.000	***	0.998	0.000	***
	RC LS2	0.377	0.000	***	0.589	0.021	**
	SC LS2	**0.084**	**0.283**	**Insignificant**	**0.654**	**0.004**	*******
CA	CA1	0.301	0.001	***	0.867	0.000	***
	CA2	0.212	0.000	***	0.836	0.000	***
	CA3	0.231	0.002	***	0.857	0.000	***
	CA4	0.195	0.030	******	0.853	0.000	***
	CA5	0.179	0.039	**	0.751	0.000	***
	CA6	0.208	0.008	***	0.774	0.000	***
	CA7	**0.030**	**0.731**	**Insignificant**	**0.799**	**0.000**	***
	CA8	**0.093**	**0.296**	**Insignificant**	**0.843**	**0.000**	***
	CA9	0.342	0.000	***	0.739	0.000	***
	CA10	**0.116**	**0.117**	**Insignificant**	**0.747**	**0.000**	***
	CA11	**0.057**	**0.514**	**Insignificant**	**0.803**	**0.000**	***
	CA12	0.199	0.000	***	0.744	0.000	***
	CA13	0.222	0.004	***	0.806	0.000	***
	CA14	**0.038**	**0.648**	**Insignificant**	**0.741**	**0.000**	***
FP	ROA	0.268	0.000	******	0.573	0.000	***
	ROE	0.310	0.000	***	0.688	0.000	***
	TSR	**0.132**	**0.192**	**Insignificant**	**0.968**	**0.000**	***

Continue table A.3.8: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue second research framework							
BSC Implementation extent	BSCImp1	**0.159**	**0.139**	**Insignificant**	**0.769**	**0.000**	***
	BSCImp2	0.756	0.000	***	0.985	0.000	***
	BSCImp3	0.168	0.042	**	0.789	0.000	***
	BSCImp4	**0.067**	**0.604**	**Insignificant**	**0.794**	**0.000**	***
	BSCImp5	0.197	0.013	**	0.597	0.000	***
Third research framework							
IC	HC LS3	**0.058**	**0.245**	**Insignificant**	**0.689**	**0.006**	***
	RC LS3	0.244	0.000	***	0.703	0.000	***
	SC LS3	0.989	0.000	***	0.998	0.000	***
CA	CA1	0.293	0.000	***	0.873	0.000	***
	CA2	**0.034**	**0.693**	**Insignificant**	**0.853**	**0.000**	***
	CA3	0.158	0.017	**	0.836	0.000	***
	CA4	0.176	0.031	**	0.849	0.000	***
	CA5	**0.050**	**0.550**	**Insignificant**	**0.769**	**0.000**	***
	CA6	0.302	0.000	**	0.774	0.000	***
	CA7	0.177	0.014	**	0.802	0.000	***
	CA8	**0.091**	**0.210**	**Insignificant**	**0.837**	**0.000**	***
	CA9	0.345	0.000	***	0.731	0.000	***
	CA10	0.147	0.010	**	0.759	0.000	***
	CA11	**0.052**	**0.470**	**Insignificant**	**0.798**	**0.000**	***
	CA12	**0.020**	**0.768**	**Insignificant**	**0.725**	**0.000**	***

Continue table A.3.8: Outer weights and significance test (Second order analysis)							
Construct	**Indicator**	**Weight**	**p-value**	**Significance**	**Loading**	**p-value**	**Significance**
Continue third research framework							
FP	ROA	**0.137**	**0.694**	**Insignificant**	**0.521**	**0.039**	***
	ROE	0.243	0.000	***	0.699	0.000	***
	TSR	**0.971**	**0.081**	**Insignificant**	**0.989**	**0.000**	***
BSC Implementation extent	BSCImp1	0.156	0.012	**	0.774	0.000	***
	BSCImp2	0.601	0.000	***	0.969	0.000	***
	BSCImp3	0.189	0.003	***	0.828	0.000	***
	BSCImp4	0.173	0.007	*******	0.841	0.000	***
	BSCImp5	**-0.013**	**0.768**	**Insignificant**	**0.704**	**0.000**	***
BSC Implementation at different levels	BSCL1	0.401	0.000	***	0.943	0.000	***
	BSCL2	0.355	0.001	*******	0.947	0.000	***
	BSCL3	**-0.046**	**0.340**	**Insignificant**	**0.600**	**0.000**	***
	BSCL4	0.348	0.000	***	0.899	0.000	***
BSC Implementation Success	BSCSucs1	0.481	0.000	***	0.920	0.000	***
	BSCSucs2	0.375	0.000	***	0.844	0.000	***
	BSCSucs3	0.116	0.023	**	0.586	0.000	***
	BSCSucs4	**0.086**	**0.083**	**Insignificant**	**0.548**	**0.000**	***
	BSCSucs5	0.169	0.003	*******	0.643	0.000	***
	BSCSucs6	**0.027**	**0.635**	**Insignificant**	**0.630**	**0.000**	***
Top MGMT Support	Involvement	0.912	0.000	***	0.976	0.000	***
	Support	0.229	0.009	***	0.788	0.000	***